The Rubber Age

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 42 FEBRUARY, 1938 No. 5

Purification and Concentration of Rubber Latex

(With Especial Reference to Dialysis)

By H. P. Stevens, J. W. W. Dyer, and J. W. Rowe

THERE are three manufacturing processes in use for the concentration of latex, two of which also give some purification. Evaporation by heating with a potash soap stabilizer added *(1)* gives a reversible paste of 60 to 70% concentration containing all the serum constituents. Centrifugal concentration *(2)* to 60% gives a mobile fluid, partly purified by the removal of some of the serum. Creaming *(3)* gives a partly purified fluid latex containing, however, the creaming agent. It is also possible to purify latex by some form of filtration *(4)*, either through a porous filtering medium or by some type of ultrafilter. So far as is known, however, this process has not found practical application.

Articles made from latex are usually obtained by evaporation, coagulation, or gelling, and contain water-soluble and hygroscopic materials which occur in the serum and in many cases are undesirable constituents of the finished product. This paper describes results obtained in the investigation of dialysis as a method of removing these water-soluble constituents from latex, and in the concentration of dialyzed latex by evaporative methods.

Dialysis has been regarded as the least promising of the various possible purification processes, on account of its slowness and the probability of the latex putrefying and coagulating during treatment under the tropical conditions on the estates. However, it will be shown that an 80% purified latex may be obtained in eight hours, ammonia may be used as a preservative, and tropical temperatures are if anything an advantage, a rise of temperature increasing the rate of dialysis.

Commercial dialyzers are built up of alternate water and liquor cells, separated by sheets of parchment paper, so designed as to give a large surface for diffusion for a relatively small volume of liquor. This design was adopted for use with latex. Ammonia at the considerable dilution generally used in preserved latex has little or no chemical action on the paper and there is little danger of rupturing the septum from this cause.

Description of Dialyzer

The dialyzer unit is built up of teak frames about 21 inches square and ½-inch thick separated by sheets of the dialyzing membrane to form alternate latex

This article is reprinted from the October, 1937, issue of the *Journal of the Society of Chemical Industry*.

(1) B.P.213,886, 243,016, 244,727, 250,639, *et seq.*
(2) B.P.219,635, 319,410, 328,766, 393,644, *et seq.*
(3) B.P. 226,440, 268,299, 344,647, *et seq.*
(4) See also B.P. 219,277, 344,875 and 393,644.

and water cells. The membranes are supported by stainless steel wire grids, supported by teak spacing blocks in the water cells. The whole is clamped between iron frames bolted together. These are the essential parts of the dialyzer itself apart from accessory apparatus. The assembly into the simplest unit is shown diagrammatically in Fig. 1, with the parts spaced for clearness. The cells are provided with inlet and outlet connections. The dialyzer is mounted vertically on a table, with a water heater tank and circulating pump below (Fig. 2). In order to get consistent results it is important to maintain a uniform flow through the water cells, and this is obtained by feeding the water into the bottom of the cells from a constant head, the overflow returning to the heater tank.

The level of latex in the cells is read on gauge glasses. The bottoms of the cells are joined together. When two units are employed the latex cells in each are connected separately to two air lines which are maintained at different pressures. By an arrangement of coupled taps the connections to the two different pressures may be reversed at will. Further details may be obtained by reference to B.P. 458,130.

Methods of Operation

(a) With to-and-fro movement of the latex.—This is the best method to use for the rapid dialysis of latex. The cells are half filled with latex and connected to the two air lines at different pressures. The water circulation is started and the temperature adjusted. The latex flows from the unit connected to the higher pressure to the other unit. The air connections are then reversed and the latex flows back again. By this device the latex is continually mixed, which accelerates dialysis, and maintained under a pressure which counteracts the dilution of the latex which would otherwise occur, due to the osmotic activity of the water-soluble constituents of the latex serum.

(b) With stationary latex.—This arrangement does not give such rapid dialysis but can be more accurately standardized. One latex cell only is used. The water circulation is as before.

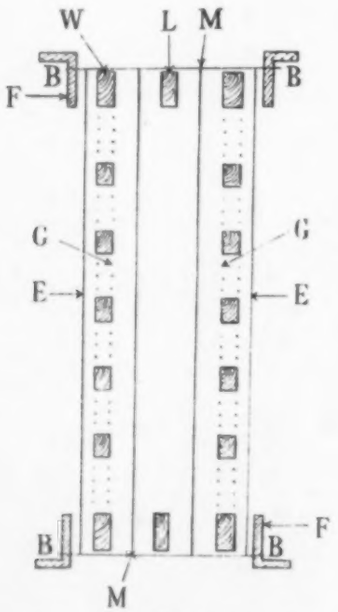


FIG. 1.
F—Frame; B—Bolts; E—End plate; G—Wire grids; W—Water cell; M—Dialyzing membrane; L—Latex cell.

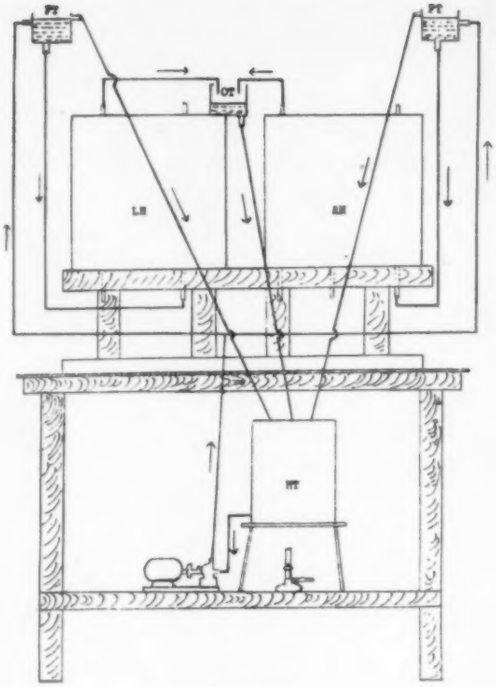


FIG. 2.
FT—Feed tanks; OT—Overflow tank; LH, RH—Dialyzer units; HT—Heater tank.

Results Obtained in the Dialysis of Latex

(a) With to-and-fro movement of the latex.—Using the dialyzer as described above with four latex cells in each unit, about 14 liters of normal ammonia-preserved latex may be purified of 80 to 85% of its diffusible impurities in 8 to 9 hours, using two charges of soft water at 55°. Substantially all the remaining impurities can be removed by a further similar treatment. Best results are obtained when the air pressures are adjusted so as to allow about 15% dilution.

On dismantling the dialyzer it is found that all the latex does not drain out. A proportion adheres to the membranes as a paste of about 70% dry rubber content. This paste consists of uncoagulated latex, and although very unstable to mechanical treatment it can with care be redispersed in a dilute solution of ammonia to an apparently normal latex. It does not, however, redisperse in the purified latex under the mixing effect of the to-and-fro movement.

When allowing a dilution of about 15% to occur the formation of paste is slight. However, on raising the air pressure so as to keep the latex at constant volume the formation of paste on the paper becomes considerable. This paste formation is objectionable for two reasons: first, because it partly blocks the dialyzing membrane and retards purification; and secondly, because the loss of this more concentrated portion from the bulk of the latex reduces the dry rubber content of the liquid product. In spite of various modifications in procedure, the only known way of preventing the paste forming was to allow dilution. This is not desirable since the demand is for concentrated latices. The inclusion of a small portion of stabilizer, *e.g.*, 1% of Lissapol A, in the latex reduces the paste formation considerably, but does not prevent it sufficiently.

There are no references to this phenomenon in the literature, so the following series of experiments was made in an attempt to understand the causes of paste formation, as a preliminary to preventing it.

(b) With stationary latex.—The experiments were carried out with stationary latex in one cell, thus giving more accurate control of conditions.

Before starting the main series of experiments, some preliminary trials were made. Some normal ammonia-preserved latex was completely purified by dialysis of all diffusible impurities. On further treatment in the dialyzer under no external pressure, the volume remained constant, and, as would be expected, no paste was formed on the papers. When an air pressure equal to 7 inches of mercury was applied, the volume diminished due to ultra-filtration and a layer of paste was formed on the membrane. All further experiments were, therefore, carried out at constant volume, so as to prevent the ultra-filtration effect. Constancy of volume of the latex is obtained by adjusting the air pressure during the progress of dialysis so as to balance the osmotic effect of the diffusible impurities in the latex.

Some normal ammonia-preserved latex was now dialyzed under constant-volume conditions and considerable deposit of paste was found on the membranes. This cannot be due to ultra-filtration since there has been no concentration. It can be due only to the removal by dialysis of the diffusible impurities. By some means the water-soluble constituents of the latex, as they diffuse to and through the membrane, carry with them some of the rubber particles and concentrate them in a pasty layer on the membrane. The main series of experiments, now to be described, was carried out with the dual object of determining the causes of this hitherto unrecorded phenomenon, and finding out which of the latex constituents was likely to be responsible. The following technique was adopted throughout this series of experiments.

Preparation of Material

A 60% dry rubber content centrifugally concentrated latex was dialyzed with several changes of softened water under an air pressure of 1 inch of mercury. A latex purified of all diffusible impurities was thus obtained without loss by paste formation, and dilution occurred to about 45% dry rubber content. Various additions of diffusible materials were made and the dry rubber content was adjusted to 40%. The ammonia content of the latex and of the dialyzing water was adjusted to 0.1%. This precaution prevents coagulation of the latex. It has no effect on paste formation. 2½ liters of the compounded latex were used in each experiment.

Experimental Procedure

Dilution of the latex during dialysis prevents paste forming; concentration of a purified latex by an imposed pressure forms paste by ultra-filtration. Therefore all experiments were carried out at constant latex volume, a suitable air pressure being applied at the start and reduced as required. The latex volume was checked by readings on the gauge glass. 26 liters of soft water containing 0.1% of ammonia were heated to 50° and circulated for 7 hours. The weight of each addition diffused was calculated by analysis of the water or of the latex at the end of the experiment. The latex was drained out slowly, the dialyzer stripped, and the membranes with adhering paste were removed, dried, and weighed, the paste being recorded as the weight of rubber which is deposited on the membranes.

Results

The distribution of the paste on the membranes is usually uniform when the flow of water on the other side is uniform, as it is in this series. However, when the addition is sodium chloride, sodium carbonate, or sodium sulfite, the paste is deposited almost entirely on the top half of the membranes. The bottom half of the membranes is clear of paste, except opposite the wires of the stainless steel grids and the teak separating blocks in the water cells, where a little is deposited. This is an unexpected result, since diffusion is presumably least opposite these obstructions, and in all other cases the deposition of paste occurs where most diffusion can occur.

TABLE I.

ADDITIONS TO LATEX IN ORDER OF "PASTE PER GRAM DIFFUSED"

Addition % on Latex	*Grams Diffused*	*Paste*	*Paste per Gram Diffused*	*Mol. Wt.*
2.5% sodium stearate	0	0	...	306
2.5% sodium sulfite	58	36	0.62	126
3.0% sodium carbonate	56	66	1.2	106
2.5% sodium chloride	53	73	1.4	59
4.6% ammonia*	94	160	1.7	35
5.0% borax	65	154	2.4	202
12.0% sucrose	100	250	2.5	342
5.0% sucrose	59	168	2.8	342
6.0% glucose	80	227	2.8	180
2.5% glycerine	55	178	3.2	75
2.5% urea	47	164	3.5	60
3.3% existing	32	111	3.5	...
3.5% serum solids	45	160	3.6	...
1.75% serum solids	26	140	5.4	...
0.5% serum solids	12	88	7.3	...

* Calculated as NH_4OH.

The results for each addition are summarized in Table I. For comparison the figures for a normal ammonia-preserved latex with its existing diffusible constituents are given, and those for the addition of "serum solids" which are obtained by the evaporation of the serum remaining after the coagulation of the rubber during the commercial preparation of crepe. The paste deposited per gram of each addition diffused is calculated and the additions are arranged in this order with the molecular weight of the addition in the last column.

Sodium stearate does not diffuse and no paste was formed. The electrolytes come next and the "paste per gram diffused" is related inversely to their molecular weight with the exception of borax. The non-electrolytes form more "paste per gram diffused," which is also related inversely to their molecular weight. The existing water-soluble constituents of

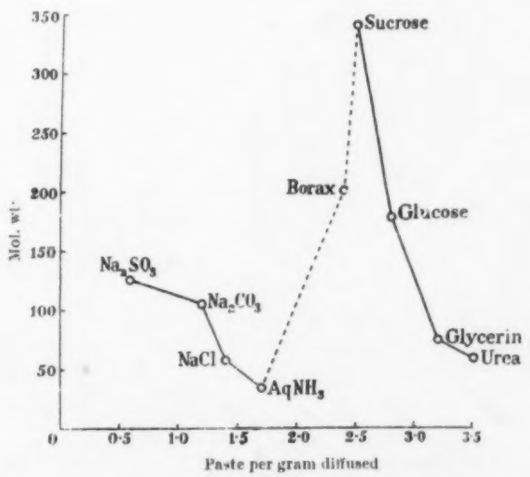


FIG. 3.

latex and the added serum solids form most "paste per gram diffused."

The "paste per gram diffused" is greater from more dilute solutions of the same material, *e.g.*, 12% sucrose, 2.5; 5% sucrose, 2.8; 3.5% serum solids, 3.6; 1.75% serum solids, 5.4; 0.5% serum solids, 7.3.

This suggests that accurate comparisons should be made between additions at equivalent concentrations, either at equal molecular weight or equivalent weight concentrations or at isotonic concentrations. With the exception of the 5% sucrose and the 1.75% and 0.5% serum solids the additions give roughly isotonic concentrations. Observations at more accurately isotonic concentrations might show greater regularity.

The "paste per gram diffused" of the various additions is plotted against their molecular weight in Fig. 3. The separation of the electrolytes and the non-electrolytes into two groups with borax occupying an intermediate position is clearly shown. It is interesting to note that the first three electrolytes, sodium sulfite, sodium carbonate, and sodium chloride, are the only three of the materials added which cause a non-uniform deposition of paste, with the peculiar reversed effect on the lower half of the dialyzing membranes which has already been described at the beginning of this section on "Results." No attempt at an explanation of these effects is made at this stage.

The inverse relationship between "paste per gram diffused" and the molecular weight suggests that the "paste per mol. diffused" might show some regularity. These values are shown in order in Table II and compared with the molecular weight in column 3 and with the estimated average weight in column 4. The average particle weight has been calculated from the degree of electrolytic dissociation at the concentration of the addition at the beginning of the experiment. The degree of electrolytic dissociation has been calculated from the available conductivity data at 18°, as sufficient values at 50°, the temperature of the experiments, are not available. Where available they indicate that temperature effects over this range are small. During an experiment the degree of electrolytic dissociation will be increasing as the concentration decreases. However, the concentrations used in the calculations are the initial concentrations in the latex, which have been taken as average values, since the true concentration, *i.e.*, the concentration in the serum, will be higher initially and lower finally than the value taken. The degree of electrolytic dissociation used is shown in column 5. The value for borax is an assumed one since sufficient reliable determinations do not seem to be available.

The non-electrolytes are in the same order as their molecular weights, but the electrolytes are not, neither do they all come together, borax appearing among the non-electrolytes. However, on comparing the "paste per mol. diffused" with the estimated average particle weight (Table II, column 4) it is found that the order is very nearly the same. This relationship is shown graphically in Fig. 4. The points do not fall on a smooth curve, but the regularity is sufficiently noticeable, particularly with the non-electrolytes, to say that the "paste per mol. diffused" is directly related to the particle weight, or, in other words, that the paste formed per particle diffusing is approximately proportional to the weight of the particle. This conclusion is tentative only and may have to be modified by further work which is in hand on this problem.

TABLE II.

ADDITIONS TO LATEX IN ORDER OF "PASTE PER MOL. DIFFUSED"

	Paste per Mol. Diffused	*Mol. Wt.*	*Estimated Average Part. Wt.*	*Estimated Average Degree of Electrolytic Dissociation*
4.6% aq. NH_3*	60	35	35	1%
2.5% NaCL	81	59	33	78%
2.5% Na_2SO_3	78	126	55	65%
3.0% Na_2CO_3	125	106	53	50%
[illegible]	[illegible]	[illegible]	60	....
2.5% glycerine	242	75	75	....
5.0% borax	480	202	101	50%
6.0% glucose	511	180	180	....
12.0% sucrose	855	342	342	....

* Calculated as NH_4OH.

Discussion

The phenomenon of colloidal concentration at the membrane in constant-volume dialysis which has been described above is of interest in a wider field than latex technology. As far as the authors are aware, it has not been previously recorded in the literature and it is anticipated that it will be found to occur with colloids other than latex particles. The living cell in plants and animals is a constant-volume dialyzer with a semi-permeable membrane as a cell wall. It contains colloids and crystalloids. When the crystalloids dialyze out, as they do at times, they will concentrate the colloids on the cell wall. This should help to explain the mechanism of growth in thickness of cell walls, as occurs, for example, in the woody tissues of plants. It may also explain the gradual cessation of flow and blocking of the ends of the latex vessels after tapping, the cream deposited on the cell walls being gradually swept down until it accumulates at the lower part near the severed ends.

The authors advance the theory that the cause of the concentration at the membrane is a bombardment of the colloid particles by the diffusing solute. The rubber particles in latex are in Brownian movement and they migrate in cataphoresis. They must therefore be able to move freely. During dialysis there is a concentration gradient of solute from the center of the cell to the membrane, so that the rubber particles will be subjected to a greater bombardment from the inside of the cell than from the outside and the resultant pressure will impel them towards the membrane. This pressure exerted by the solute molecules or ions is proportional to their mass, which is in agreement with the experimental result that the paste formed per solute particle diffusing is approximately proportional to the weight of the particle.

J. W. McBain and Tsun H. Liu *(5)* have noticed a somewhat similar effect in experiments on diffusion with solutions of glucose and hydrochloric acid from which they conclude that the diffusion column of one substance by virtue of its concentration gradient may by the bombardment of its molecules accelerate, retard, or even reverse the diffusion of another substance. In this case, of course, the work dealt not with colloidal particles but with molecules and ions, so there is no concentration at the membrane, the bombarded substance being carried by the diffusing substance into the other cell where its concentration increases.

Although McBain's results were obtained on non-colloids there is no reason why the same effect should not occur with colloids, with the difference that the colloid will be stopped by the membrane, as we have found to occur with latex.

This theory is being investigated more fully in further work in progress in the authors' laboratories.

(5) *J. Am. Chem. Soc.*, 1930, **53**, 59.

Concentration of Latex

From the foregoing account of the experimental work with the dialyzer it follows that satisfactory purification is quite practicable provided dilution is allowed to a sufficient extent to prevent paste formation. It appears that all the diffusible impurities in latex are likely to cause paste formation at constant latex volume, and up to the present no simple practical means has been discovered to prevent this or to redisperse the paste. Therefore parallel experiments have been made on the concentration of the purified but diluted latex.

Two evaporative methods for the concentration of the dialyzed latex have been used in this investigation, *viz.*, evaporation with stirring from an open vessel heated on a boiling water-bath, and evaporation in a spray dryer. These two methods show interesting differences both between themselves and between normal and dialyzed latex.

No difficulty was experienced in concentrating normal or purified latex by simple evaporation provided the ammonia content was maintained by periodic additions, but it is a slow process. Spray drying is much more rapid but has the disadvantage from the experimental viewpoint that even the smallest constructional unit requires a considerable quantity of latex.

Comparing ammonia-stabilized latices concentrated to 60% dry rubber content by open evaporation, dialyzed latex is found to have a relative viscosity of 0.7 compared with 5.0 for normal latex.

Comparing normal latices stabilized with Lissapol A and concentrated by evaporation in an open vessel and in a spray dryer to 60% dry rubber content, the spray drying is found to give a relative viscosity of 1.9 compared with 11.0 for the open vessel.

It is not possible to compare the viscosities of normal or dialyzed latices stabilized by ammonia only and concentrated by the alternative methods, since ammonia alone will not stabilize latex sufficiently for spray drying. It is necessary to use some further stabilizer, otherwise extensive coagulation occurs during spraying. For example, ½% of ammonium stearate on the dry rubber content of dialyzed latex will stabilize it against concentration to 62% dry rubber content and the spray method again gives the concentrate of lower viscosity, 0.7 against 1.3.

The lower viscosity of the concentrates from the spray dryer is ascribed to the very much shorter heat-treatment.

The fact that dialyzed latex does not give such large viscosity differences by the two methods shows that dialysis removes some substance from latex which raises the viscosity of latex concentrates when they are prepared by a method involving relatively prolonged heating. It is not known what this substance is.

The following experiment gives further examples of this effect. Three stabilized latices were concentrated in a 500-c.c. evaporator with a boiling water-jacket and stirrer from 36% dry rubber content to 60% dry rubber content and their relative viscosities measured by the falling sphere method.

Original latex	*Stabilizer % on latex*	*Relative viscosity Unstirred*	*Stirred*
Normal	.....½% Lissapol A	100	42
Dialyzed	.....½% Lissapol A	2.8	2.8
Dialyzed	.....1% K stearate and 1% free KOH.....	1.0	1.0

It will be noted in this case that the concentrate from the dialyzed latex is again of a much lower viscosity. Moreover, the concentrate from dialyzed latex does not show thixotropy, whereas stirring of the concentrate from normal latex reduces its viscosity to about half its normal value.

Since the spray concentrates show an advantage in lower viscosity and speed of preparation, experiments were made on a larger spray dryer, which had been used previously to concentrate an ammonia-preserved latex, stabilized with 1% of potassium stearate and 1% of free caustic potash, from a dry rubber content of 38% to 60%. In this case it was desired to use less stabilizer, so before concentrating the dialyzed latex a preliminary run was made on normal ammonia-preserved latex. The latex was diluted to the same dry rubber content as the dialyzed latex, *viz.*, 34%, and ½% of stabilizer (Lissapol A) was added. The experiment was successful, about 60 gallons being concentrated in one hour from 34% to 55% dry rubber content. There was a loss of about 3 to 4% by drying on the walls of the container.

The dialyzed latex was divided into two portions. As it is slightly less stable than normal latex, one half was stabilized with ½% of Lissapol A and ½% of caustic potash. It was successfully concentrated from 34% to 60% dry rubber content. The second half was stabilized with ½% of Lissapol A only and successfully concentrated from 34% to 65% dry rubber content. There was in both cases a loss of about 3 to 4% due to drying. The concentrates were of about the same fluidity as a 60% centrifugally concentrated normal latex.

Although the method of spray concentration shows advantages in regard to viscosity of concentrates it is not yet possible to take full advantage of this method since some of the smallest drops of spray were completely dried in the process to give minute, yellow, globular particles of dry rubber. These particles do not tend to unite and are in fact powder from latex in suspension in latex. They are too small to remove by straining but can be removed experimentally by diluting the concentrate when they rise to the surface. The surface layer can be removed and the clot dried and weighed. This procedure indicates that about 17% of the rubber is present in this form. The presence of these particles in this form is apparent from the "lace-like" film of liquid latex left when a bottle of it is shaken and the latex drawn down the shoulder or sides of the bottle. There is little doubt that a more uniform atomization of the latex in the spray would overcome these difficulties and experiments are in hand to this effect.

The spray-dryer concentrates are perfectly stable

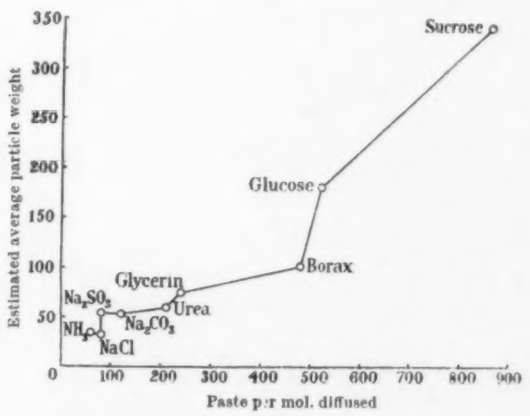


FIG. 4

to storage both in the presence of these large particles and after their removal.

This work has been carried out on behalf of the Rubber Producers' Research Association, to whom the authors are indebted for permission to publish.

Summary

Constructional details and methods of operation are described of a pressure dialyzer capable of treating 4 gallons of latex.

The removal by dialysis of various materials from latex maintained at constant volume is shown to cause the segregation of a concentrated pasty layer of latex at the dialyzing membrane. A preliminary investigation of this hitherto unrecorded phenomenon indicates that the degree of paste formation is related to the molecular weight of the diffusing material. It can be avoided by allowing some dilution of the latex to occur. It is considered that the segregation at the membrane is caused by a bombardment of the colloidal particles of rubber by the diffusing molecules of the solute and that this effect will be of interest in many cases of diffusion through colloidal dispersions.

Concentration of ordinary and dialyzed latex by simple evaporation and by evaporation in a spray dryer is described, and dialyzed latex is shown to have an advantage in giving a concentrate of lower viscosity.

Santoflex B—New Antioxidant

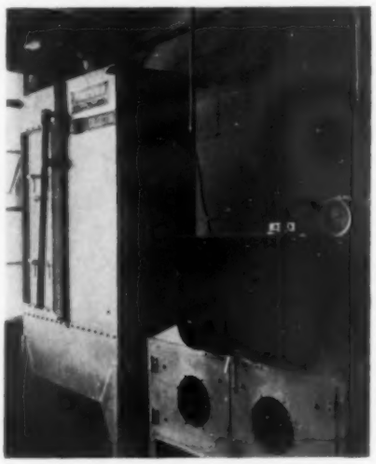
DESCRIBED as a dark gray waxy solid with a crystallizing point near 81°C., Santoflex B is the newest antioxidant to be developed by the Rubber Service Laboratories Division of the Monsanto Chemical Company, Akron, Ohio. It is a condensation product of acetone and para amido-diphenyl and is said to possess good aging and flexing characteristics. Although originally developed as an antioxidant for tires and tubes, Santoflex B is also being used in all classes of rubber goods, including belts, hose, heels, soles and footwear. Being a solid with a low melting point, the new antioxidant is easy to weigh, and yet when it is added to the batch on the mill it melts and is taken up by the rubber, thus insuring good dispersion, according to Monsanto. Because it shows very slight activation of the acceleration of the compound when Captax or Captax derivatives are used, Santoflex B increases the flexing life of the stock. The new antioxidant has a specific gravity of 1.045. One hundred parts by weight dissolves completely in an equal amount by weight of benzene.

Rubberizing Wool Yarns

A RECENT development has made it possible to rubberize wool yarns in hank form by treatment with a suitably prepared latex without any matting. The wool may be dyed either before or after the treatment, or color may be applied to the latex itself. It is believed that the process will have useful application in producing strong yarns with little twist in the manufacture of felt and in the production of permanent surface modification as, for instance, in providing water repellence, moth-proofing, etc. A remarkable degree of increase in abrasion resistance is said to be another useful effect of the latex treatment. The process was recently brought to light by the annual report of the director of research of the Wool Industries Research Association of England.

Cleaning Rubber Molds by Blasting

CLEANING of rubber molds is a common problem in the rubber industry. After a rubber mold has been used it must be freed of all rubber and foreign particles before it can be used again. Cleaning is essential since if any residual material remains in the mold accurate impressions on future operations are



Sand blast cabinet and dust collector

difficult to obtain and such residue may contaminate the molded rubber. Generally, wire brushes wielded by hand are employed in mold cleaning operations. This is an arduous process as a rule, especially when molds of intricate design are involved.

One rubber manufacturer is said to have solved the problem by blasting his molds with a small suction type sand blast cabinet and a cloth type dust collector, both pieces of equipment being illustrated herewith. A fine, steel grit abrasive is used in the blasting process. Use of this equipment, products of the American Foundry Equipment Company, Mishawaka, Indiana, is described as being much faster and producing better results than

Close-up of the sand blasting operation

other methods, besides being more economical. Molds which were formerly cleaned in three hours by one man using a wire brush are prepared for re-use by the blasting equipment in a few minutes. The amount of metal removed from the molds during the blasting process is said to be practically negligible, and the blasted surfaces emerge with a smooth uniform finish.

Development of Heat Resistant Cord

By Russell B. Newton

Superintendent, Columbus Mill, Bibb Manufacturing Co.

A PATENT has recently been issued and assigned to the Bibb Manufacturing Company of Macon, Georgia, on heat resistant cord and the process for making this cord. Since this cord is one of the most talked of developments in tire fabric today, something of the history of its development should be of interest to all members of the rubber industry.

The Bibb Manufacturing Company has played an important part in the development of fabrics used in the carcass of the automobile tire ever since the tire industry was in its infancy. In the early days of the automobile, all tires were made of so-called square woven fabric and while there were many interesting variations in the construction of such fabrics, the older heads in the industry will recall that "combed osprey" fabric, developed by Bibb, was probably the most famous tire fabric of its day.

Introduction of Cord Tire Fabric

Even before pneumatic tires were ever thought of, Bibb had been engaged in the manufacture of highly specialized cabled cords, producing more of these goods than any other manufacturer in this country. With this background, it was only natural, when the change came from the old type of square woven fabric to the modern hawser type cord, that the company should be to the front in the development of this new type of tire fabric known as cord tire fabric. As a result, the company was the first to produce a cord fabric that was acceptable to the leading manufacturers of the time.

Since then, numerous changes have taken place in the physical and technical characteristics of cord tire fabric, such as twist, stretch, flexing, recovery value, etc. The advantages of a low stretch, high break cord are now generally recognized and Bibb has again demonstrated its capacity to serve by developing heat resistant cord, which, in addition to its heat resistant qualities, also possesses all of the advantages of high break and stretch as low as may be desired.

The history of the development of tire cord made it apparent to the technical department of the Bibb concern that to make a better cord, it would be necessary to go into the problem more deeply than any one had previously gone and a tremendous amount of time and effort has been given to research in order to produce such a cord.

In the early developments of cord tire fabric, great stress was laid on tensile strength. Tire engineers, however, have made rapid progress in analyzing the requirements of cord fabric when put into a tire and it is now generally recognized that deterioration takes place in the compression side of the layer of fabric rather than the side under tension. The reasons for this will become more apparent further along in this article.

In the course of investigation made by Bibb's research department, it was learned that rubber in a stretched state will deteriorate far more rapidly than rubber that is not stretched. This can readily be confirmed by the layman, merely by taking two rubber bands of similar condition, stretching one and leaving the other unstretched, and exposing them to light and air. The stretched band will deteriorate far more rapidly than the one that is not stretched.

Cotton or other cord used in a tire and the rubber surrounding the cord is placed under tension by the pressure of air when the tire is inflated and remains under tension throughout the life of the tire. Some authorities claim that rubber when stretched will generate more frictional heat when it is rapidly flexed than rubber in a normal condition.

All authorities agree that the vulcanization of rubber is an arrested chemical reaction. After the proper ingredients are mixed to produce rubber of a certain characteristic, it is then subjected to a temperature of from 250 to 275° F., in many cases for a comparatively short period of time. This brings the rubber to the desired cure. The same point can be reached by subjecting the rubber to a lower temperature for a longer period of time. Consequently, when tires are subjected to high temperatures, a point is reached in service where the process of vulcanization is continued in any part of the carcass containing an excess of vulcanizing compound. It is then that heat becomes the greatest enemy of the tire.

It must be borne in mind that when any structure having any substantial thickness is flexed, three zones are set up: the inner zone, which is one of compression; the neutral axis; and an outside zone under tension. Consequently, any structure that undergoes very rapid and continued flexing should have its strength compressed into a minimum thickness. This not only reduces the amount of heat generated by the flexing, but the thinner structures are more conducive to the dissipation of the heat which is generated.

Five Characteristics of New Cord

In undertaking to develop an improved cord for the tire carcass Bibb engineers felt that the cord should possess certain characteristics: First, a cord that would not be affected by heat; second, a cord that when used in a tire would allow a minimum of growth; third, a cord with a minimum diameter and maximum strength —or to put it more concisely, a cord in which the strength is condensed in the minimum area of cross section; fourth, a cord in which the fibers are so fused and bonded together by the natural gums and waxes of the cotton itself that it will resist the deterioration set up by compression in the tire in service; and fifth, a cord whose elongation would not be affected by change in temperature. These are the principal thoughts

which led to the development of heat resistant cord.

As the name indicates, one of the outstanding characteristics of heat resistant cord is its ability to stand up under heat generated in the tire when operated under present day conditions. It has this ability to stand up because it retards the generation of heat. A tire constructed of this cord reduces the danger of heat blowouts and the safety factor is enormously increased when area weights are the same as those of a standard cord. Six ply tires have been constructed of this cord in which the carcass was held so thin that the riding qualities were the same as those of a four-ply tire and the safety factor that of a six-ply tire.

Another characteristic of the new cord is that when built into a tire, the growth of the tire in use is kept to a minimum. Growth in tires, especially truck and bus tires operating under heavy loads, is the source of an endless amount of trouble and any tire manufacturer will agree that if tread cracks, which are largely the result of tire growth, could be eliminated, the life of the tire would be greatly prolonged. Many tests have been run on tires made of heat resistant cord and one successful tire manufacturer reported a short time ago that on a recent test of one thousand tires made out of this cord, not a single tread crack developed, although these tires were run under all sorts of conditions as to temperature, roads, weather and loads. Another manufacturer, who has been using heat resistant cord for more than a year, reports that not a tire has been returned in that time because of tread cracks.

A further important feature of the cord is that since it is a cord of low stretch, low gauge and maximum strength, the tire builder is enabled to make a thinner structure. This results in a reduction in the amount of cotton used in a tire of given size and practically compensates for the extra cost of the cord.

Heat resistant cord is not merely a low stretch cord. It is possible for any good cord manufacturer to produce a low stretch cord within certain limits. With the heat resistant process, however, the stretch can be reduced almost to zero. The industry is not yet ready for such a low stretch and for the time being therefore, it is recommended that a stretch of 5% to 6% at the 10-lb. line be used for what is known as full heat resistant cord or 7% to 10% for semi-heat resistant.

Heat resistant cord is lower in gauge and lighter in weight than regular cord and one of its most outstanding characteristics is that while it shows scarcely no increase in normal tensile over regular cord, it has a bone dry tensile practically 20% higher than the bone dry tensile in regular cord, notwithstanding the fact that the former is much lighter.

Only by Bibb's special process can cord be made in which the fibers are so fused and bonded together by the natural gums and waxes in the cotton that it will yield all of the advantages to be found in heat resistant cord. Among these advantages is stretch as low as may be desired. It retards the generation of heat so conducive to blowouts. It also holds the tire to a minimum of growth, thereby practically eliminating tread cracks and insuring longer life for the tire.

The cord is fully protected by U. S. Patent No. 2,103,218, assigned to the Bibb Manufacturing Co.

Rubber Footwear on Display

MORE than seven million people have inspected the merchandise on display at the permanent exhibition of the company's products maintained by E. I. du Pont de Nemours & Co., Inc., on the Boardwalk at Atlantic City, New Jersey. This exhibition, which has been continuously maintained since 1916 under the direction of Mr. D. J. O'Connell, is really a service headquarters or clearing-house of information about chemical products and their industrial uses. The exhibit is located in a store, the frontage of which is nearly double and the floor space of which is 60% greater than was the first store opened twenty-years ago. The windows of the store are allotted to the various DuPont departments and divisions, usually for a period of one week during the year when an exhibition is held featuring some of the products manufactured by the customers of that department or division.

Recently, one of these window displays was devoted to rubber footwear. Against an attractive black background, the soles, heels and all-rubber shoes made by customers of the Rubber Chemicals Division using the company's chemicals and compounding ingredients were effectively displayed. Firms represented in the display included the Avon Shoe Company, Cambridge Rubber Company, Endicott Johnson Corporation, International Shoe Co., and the Miner Rubber Co.

LEFT: Recent window display of rubber footwear at DuPont's permanent exhibition. RIGHT: An interior view of the exhibition.

Johns Conveyor System

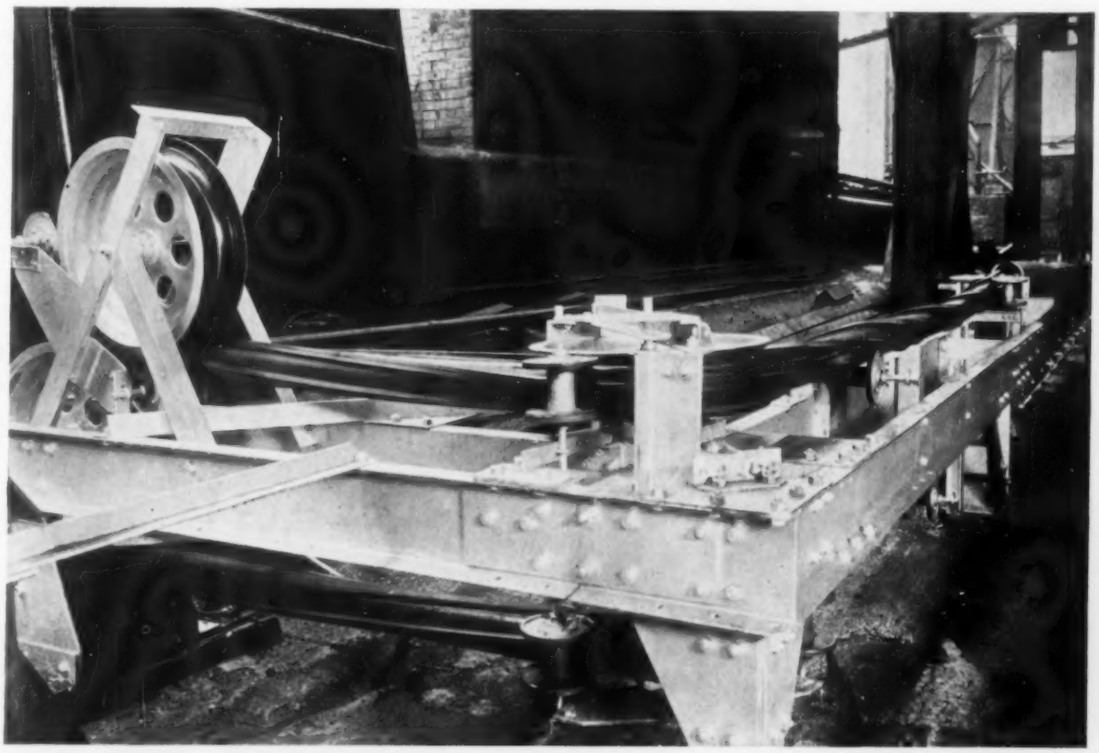
Moving Rubber Pipe Line Features Unique System which Enables Most Solids to Be Carried in All Directions

INDUSTRY has long been seeking some method of conveying solid materials through the factory. The development of such a system, it was argued, would be of inestimable value in increasing production. Although the ordinary pipe line can be run from point to point with as many turns as is desired and so be made to carry liquids in any and all directions, these pipe lines are not adaptable to carrying solids for obvious reasons. A Canadian engineer, working on this problem for many years, finally discovered a plausible solution. He figured that were the pipe line made of rubber so that it could be put in motion and caused to make any desired turns by passing around pulleys, it could be filled with solids and made to convey them in any direction. In other words, he visioned a moving pipe line. Today his vision is an actuality. Moving pipe lines are now being sold under the name of the Johns Conveyor. They are sold and installed by the Johns Conveyor Corporation, 251 Ogden Street, Newark, New Jersey.

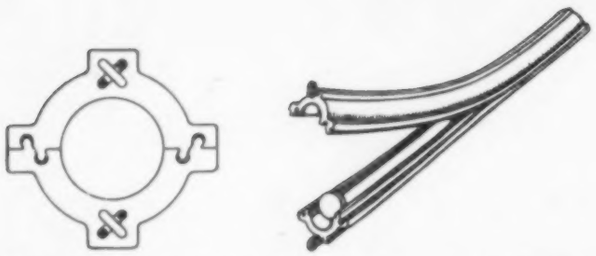
In operation, the Johns Conveyor receives the solid material to be conveyed from hoppers which may be located at one or more points along its line of travel and conveys it vertically, horizontally or in any combination of directions to any one or more predetermined points of discharge. Being made of rubber, it conveys the materials without rubbing or tumbling and therefore with a minimum of breakage and dust. It is said to be particularly useful for handling wet mixtures and sludges.

The Johns Conveyor consists essentially of a series of spliced rubber tubes, each tube being formed of two separate halves. Because of this construction it can be pulled apart at any point to receive or discharge material. The two halves of the tubes fit tightly together by means of double tongues and grooves which serve to prevent leakage of material from the interior. The two halves are not alike. The bottom or loading half is fitted with disc-like partitions or flights of rubber which serve to pick up a full load when passing through a feed hopper. These partitions are molded into the bottom half of the tube and form permanent partitions. It will thus be seen that when the two halves are joined, a series of individual compartments are formed by reason of the partitions thus preventing slipping and packing of the material being conveyed on vertical lifts.

When the two halves of the tube are together so as to form a whole unit, the entire tube is twisted much in the manner of a rope or cable so that the halves are compressed together causing a tighter seal and preventing the tube from opening. Additional strength



The flexibility of the Johns Conveyor and its ability to make sharp turns are illustrated in the above reproduction of an installation in a steel mill. This system, with 3-inch diameter belt, is used for transporting coke breeze.



LEFT: Cross-section of the rubber tube conveyor showing double tongue and groove and imbedded chain. RIGHT: Disc-like partitions, seen here in split tube, form separate compartments throughout tube.

is built into the tubes by endless chains which are embedded in ribs in the upper and lower halves of the tube, these chains extending throughout the length of the tube. The full load or tension of the system is carried on these chains, the rubber serving simply as a casing to hold the conveyed material.

Due to the fact that the materials conveyed in this new system are not rehandled in making changes of direction and that they move with the conveyor in soft rubber compartments, rubbing and breaking are minimized. According to Johns engineers, partial or intermittent loads can be handled and the conveyor can be used as a metering or measuring device in delivering material to the point of discharge. In picking up material, the rubber tube opens up at hoppers by means of suitable parting wheels and is brought together again by closing wheels. The same operation with guiding wheels is performed when the material, or a portion of it, is released at the desired point.

Due to its construction, the Johns Conveyor is noiseless, clean and free-moving. The flexible rubber tube moves around pulleys with no more effort than a rope, according to its manufacturer. The pulleys, of special type, are built into standard frames which are said to be easily attached to existing structures. Starting torque and power consumption are described as being unusually low because of the balanced, low-weight system which is equipped with anti-friction bearings throughout. The special properties of the rubber used in the system make the rubber a good medium for carrying a variety of materials. It is not subject to corrosion and it resists the attack of most chemical elements. It also resists abrasion and will not stain or discolor material which is brought into contact with it.

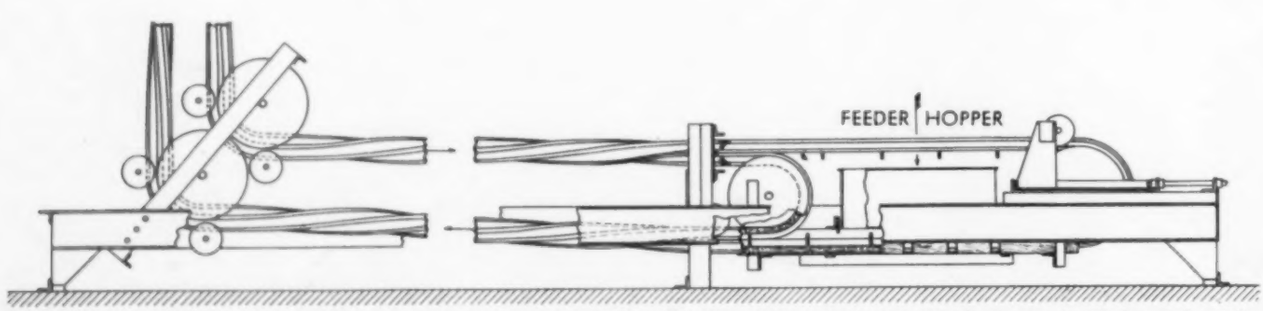
When the moving pipe line is adapted to materials which contain a fatty or oily substance some product other than natural rubber is required for the construction of the tube. The reasons for this are again obvious. In such cases the so-called synthetic rubbers or other synthetic materials of a rubber-like nature, containing the flexible property of rubber, can be used to advantage. Unlike natural rubber, these synthetic materials resist the action of oils or greases, and at the same time offer resistance to wear and corrosion. One such application has been worked out in connection with a material which has a 3% oil content, and results are reported to be quite satisfactory.

Sanitation is one of the strong points of the new conveyor system. It can easily be kept clean and sanitary, due to its unique construction. It can be washed, sterilized and dried by running the half tubes through suitable tanks and ovens. Since there is no place in the system where material can lodge, the tubes can be completely emptied and used again for other materials without mixture or contamination. Another point is that no material need stay in the system to harden or deteriorate when it is idle. It can simply be discharged and picked up again when desired. The position of the pulleys may be changed and the entire system altered as to length or direction for the purpose of extension or arrangement.

At a conveying speed of 100 feet per minute, and when handling material weighing 100 pounds per cubic foot, the capacity of the moving pipe line conveyor in tons per hour is estimated to be 6 tons for a 2-inch diameter tube; 24 tons for 4-inch diameter; and 54 tons for 6-inch diameter. For material weighing 50 pounds per cubic foot the capacity in tons per hour is exactly halved.

A wide assortment of materials can be economically and efficiently handled by the Johns Conveyor. These materials include soap powder, limestone, coal, coke breeze, crushed metal, magnesium oxide, abrasive chemicals, briquetted and powdered accelerators, medicinal chemicals, carbon black, clay, and various wet mixtures, such as mortar and concrete. Food materials that can be handled include grains, flours, meals, breakfast foods, starch, cocoa beans, oil seeds, small fruits and dried vegetables, nuts, coffee, tea, sugar, salt, and spices. For such operations as the handling of grain, starch or other inflammable products, the new conveying method offers freedom from the hazard of dust explosions or fire.

Although designed primarily for the conveying of solids and semi-solids, the Johns system may also be adapted to carying liquid materials. In handling water or other liquids the partitions in the bottom half of the rubber tube are compressed so firmly against the top half when the tube is twisted in rope fashion that each compartment carries its own particular load of water independently of the others. Because of this independent action of the partitions or compartments, the internal pressure at the bottom of a 1,000 foot lift is no more than it is at the top when liquids are being carried. The system has been adapted to conveying liquids particularly in applications where for some



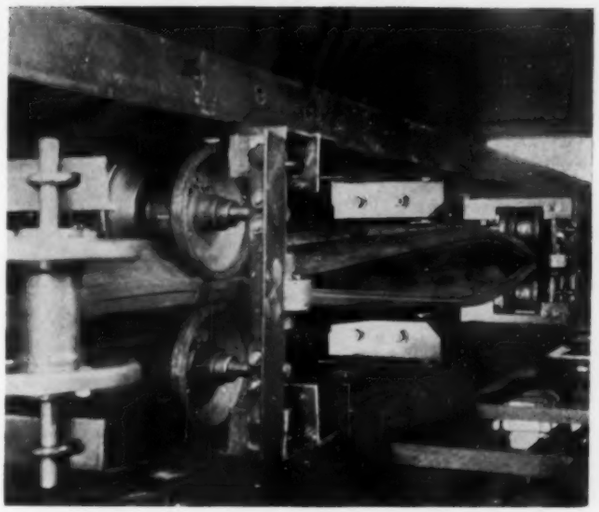
Diagrammatic drawing indicating how the belts come apart; one-half of tube passes around and underneath the hopper, is filled, and then joins again with the other half. At the left the corner turn is indicated: belts untwist, pass around pulleys, and go into twisted position again.

reason the use of a pump is not desirable. For instance, it may be used to remove water from mines, deep wells, and quarries.

The first Johns Conveyor was installed in 1933 to handle spillage coal in a Canadian steel plant and has been in daily operation since. Subsequent installations in the United States and Canada are handling coal, lime, raw sugar, soap powder and chemicals, among other materials. Installations are also either planned or have been made to handle coke breeze, boiler slag, wood pulp, and other materials which are difficult and costly to pump.

While installation of the new conveyor system varies with the conditions met with at the particular factory involved, brief descriptions of a few installations should prove of interest. For instance, an installation at the Passaic (N. J.) plant of Manhattan Rubber for the handling of rice coal handles 9 tons of coal per hour with a 2-inch diameter tube which travels 300 feet per minute. In this plant, the bunkers or bins are located 80 feet above the loading station or hopper. Loading and unloading follows the same procedure. A 3 h.p. motor is connected by a speed-reducing V-belt drive to the conveyor driving pulley near the unloading station. Because of the position of the loading station or hopper in this instance, the lower or loading half of the conveyor is slightly longer than the upper half. When the conveyor travels for a considerable distance, as it does at the Manhattan Rubber plant, take-ups are provided at necessary points to maintain the required tension in the tube.

Another interesting installation is that used by the Lake Shore Gold Mines, Ltd., at Kirkland Lake, Ontario, Canada. In this case, a 4-inch diameter tube is used to carry crushed lime from the pits to a pent house structure located on top of one of the company's storage tanks, a perpendicular climb of 87 feet. Both the rising and descending pipes or lines in this instance are closed and twisted, the rising one containing crushed lime and the descending one empty and ready to pick up a load continuously as it moves through the hopper in the pit. There is a parting wheel and a closing wheel in the pit and another set in the tower to open and to close the two rubber line halves for pick-up and for discharge of material over the center of the storage tank after making a right angle turn from the vertical position.



An intermediate discharge assembly is shown above. Guiding wheels, clearly seen, force tube apart for discharge purposes and then close it.

Still another installation is in the Wagstaffe plant of Canadian Canners, Ltd., at Hamilton, Ontario, Canada, where the conveyor is used to handle raw sugar. The method of loading and unloading is naturally designed to suit the material handled and the plant layout. Intermediate pick-ups and discharges can be arranged where desired, as when the conveyor serves several bins or silos. It is interesting to note that it is possible to cleanse and sterilize the belt between discharge and loading joints without stopping operations.

Standardization of Camel Back Dies

CONTINUING its efforts to standardize the camel back industry and so promote the relationship between the industry and tire retreaders, the Rubber Manufacturers Association has recently taken another forward step. Last year, the Association worked out a standard system of die numbers, which was adopted by the camel back manufacturers. Under this system, retreaders are indicating the dimensions of the camel back when they write the die number. Now the Association has formulated an industry program on standard die sizes.

Data collected by the R.M.A. showed that due to lack of standardization the manufacturers kept adding miscellaneous die sizes to their lines until a point was reached where there were more than 2,300 different sizes. One reason such a large number had accumulated was that die sizes having the same crown width were being made up in too many variations of base widths. For example, in the case of camel back with a 4-inch crown, a retreader had to decide between 14 base widths varying from 5 to 8 inches. To effect standardization, the first step was to determine the relative popularity of the 2,300 die sizes in use.

The popularity report revealed that the most popular die sizes were those with their crown and base dimensions in inches and even eighths of an inch, such as 2/8, 4/8 and 6/8-inch. Therefore, the odd eighth-inch sizes, where crown or base dimensions ended in ⅛, ⅜, ⅝ or ⅞-inch fractions, were eliminated. The most popular wing widths for retreading of passenger car tires were found to be ¾, 1 and 1¼-inch widths; for small truck and bus tires—1, 1¼ and 1½-inch widths; and for large truck and bus tires—1¼, 1½ and 1¾-inch widths. Here again the odd eighth-inch sizes were eliminated.

Based on this report, the following program has been adopted by the industry: (1) Standard camel back die sizes are those having their crown, base and wing dimensions all graduated in ¼-inch steps, omitting the odd eighth-inch fractions (⅛, ⅜, ⅝ and ⅞-inch). (2) Any camel back die having either its crown, base or wing dimension ending in an odd eighth-inch fraction is a non-standard die size.

Although any new dies to be made up must conform to the standardization program as officially adopted, retreaders will continue to be furnished with certain non-standard dies until they understand the new program and see the advantage in changing over to the standard dies, according to the Rubber Manufacturers Association.

Wingfoot Wall Rubber

MAINTENANCE of walls in homes, offices, public buildings and other places is a considerable item when neatness and cleanliness are scrupulously maintained. It involves repainting, re-papering, or washing, although the latter operation does not always obtain the desired results. The answer to this "housecleaning" problem may be found in a new rubber wall material recently introduced by the Goodyear Tire and Rubber Company, Akron, Ohio, under the name of Wingfoot Wall Rubber.

Wingfoot Wall Rubber is similar in appearance to Goodyear's rubber flooring material, although it is somewhat thinner, being one-sixteenth inch in thickness. It has been made available in a wide range of colors, and is said to be permanent in character and easy to install. The new wall covering material has a fabric backing, vulcanized to form an integral part, this construction making it easy to apply to wall surfaces with an adhesive which seals it to the wall with a permanent bond.

Once installed, the new wall rubber is said to provide a long-lasting easy-to-clean surface which combines economy with beauty. Dirt will not penetrate the smooth, glossy surface, and may be removed readily with a damp cloth. The latest addition to the Wingfoot line is described as being especially suited for kitchens and bathrooms in the home, although it is also applicable to other rooms where either plain or panelled effects are desired.

Casting Resins in Rubber Molds

FOR some time manufacturers of molded plastics have been seeking to perfect a method which could be utilized to bridge the gap between the well established cast resins which are machined or fabricated from stock shapes and the equally well established molding compounds which can be formed only in steel or similar molds. There are a number of good reasons for the interest in bridging that gap: first, because it is often desired to produce a few samples to gauge a market; second, because of the cost factor involved in producing complicated molds; and third, because of the time element involved. A process of molding or casting resins in rubber molds, which has been worked out by Ralph Mancuso of the Moldite Corporation, 345 West 35th Street, New York City, is believed suitable for bridging the gap, according to an article by Jean Mayer in a recent issue of *Modern Plastics*.

In the Moldite process, the model is first reproduced in a special compound which is capable of being cast in a gelatin mold, and yet has sufficient strength to resist vulcanizing pressure, and is attached to a plate which holds it firmly in place. This plate is placed in a vulcanizing frame and covered with enough rubber stock to fill the frame when it is placed in the press. In less than one hour of curing the rubber mold is ready for use. It is said to be tough and flexible and to permit the original model to be withdrawn regardless of undercuts or intricacies of design. Since the mold is made of rubber, it will stand up under continuous service for a long period of time unless carelessly handled by the operator.

The next step in the process is to fill the cavities of the mold with a special resin in its liquid stage (making several cavities in the rubber mold requires only that an equal number of original models be cast in the special plaster-like compound and fastened in the vulcanizing frame before the mold is cured) and then place the filled mold into an oven where it remains for one to two hours in a temperature from 100° to 120° F. When complete polymerization has taken place, the mold is removed and the parts snapped out. Finishing is accomplished by the usual methods. The resin used is a phenol-formaldehyde of the cast resin variety to which a chemical accelerator has been added to promote rapid curing.

The use of rubber molds for casting resins has both obvious advantages and disadvantages. For instance, close tolerances of industrial parts cannot be successfully maintained because of the flexibility of the mold, but on the other hand the flexibility feature permits casting shapes that depend upon undercuts for their decorative effect. These effects could not possibly be secured by conventional methods in a metal mold. Practically any desired color, or any combination of colors in mottled effects, can be secured by the use of the rubber molds. Bag tops, bas-relief plaques, dogs' heads, and buttons of intricate design have been cast by this process.

Durability of Rubber Bearings

THE durability of rubber bearings was recently stressed by an experience encountered in the shop department of the Baldwin-Southwark Corporation at Philadelphia, Penna. Back in 1925, lignum vitae was being used as a bearing material in a 16,500 h.p. Morris turbine installed by the company in the Holtwood (Penna.) plant of the Pennsylvania Water and Power Company. So rapid was the wear of silt and coal dust in the Susquehanna River on this material, however, that it was replaced with a rubber-lined bearing. The bearing has an inside diameter of 24 inches and a length of 72 inches. The rubber used was of soft stock, comparable with that used in automobile tires. Several months ago it became necessary to make repairs to the bearing because of wear which had taken place in the bronze sleeve surrounding the shaft. Upon removal of the bearing, the rubber lining, after almost twelve years of continuous use, was found to have worn only about 1/16th of an inch on the diameter, or 1/32nds of an inch on the radius. The rubber was in perfect condition, as resilient and live as it was at the time of original installation.

Rubber Industry Outlook

Latest Dun and Bradstreet Survey Reveals that Sales of General Rubber Goods Reached an Eight-Year High in 1937

THE volume of general rubber goods sales during 1937 reached an eight-year high, according to the latest survey conducted by Dun and Bradstreet, Inc. Credit for achieving this new high was given by the statistical organization to unremitting research work which has widened the use of rubber in such a variety of new fields that all annual totals back to 1929 were exceeded in 1937, even though production, shipments and original equipment sales of automobile tires failed to match the 1936 figures. Orders to wholesalers went from 20 to 30% over the previous year's, while retail sales rose 15 to 25% from the 1936 dollar value. Consumption of crude rubber was but 5.5% less than the peak set in 1936.

Greater price stability was considered the strongest factor for the further expansion of sales during 1938. The chief contributor to this stability will be the cut in quotas of crude rubber permitted to leave producing areas. Another contributor will be the continued extension of rubber application, with a concomitant lessening of consumption dependence on tire manufacture. This shift has been in progress since 1927, when tire sales accounted for 68 per cent of the industry's annual dollar volume. By the end of 1937, this advantage had shrunk to 58 per cent.

Heavy inventory write-offs were made by most manufacturers at the close of 1937. Those holding large rubber and cotton stocks took substantial losses. With some of the tire manufacturers, year-end inventory values were below the average prices paid for crude rubber. To effect operating economy, many of the factories plan to reinstate the eight-hour day to replace the six-hour one granted workers last spring.

Not all divisions of the rubber goods industry were affected by the production downtrend during the last half of 1937. With manufacturers of rubber belting, specialties, and some mechanical and industrial goods, output did not go much under the previous year's until December. This pushed the 1937 volume 15 to 25 per cent ahead of that for 1936. More unit pairs of rubber footwear also were turned out than in 1936, with March and April orders for sandals above the 1937 bookings. In automobile tires, production started to drop after the year's high in March.

Increase in Tire Replacement Sales

Marking the first time since 1928, there was a year-to-year increase in replacement sales of automobile tires in 1937. The total rose to approximately 30,000,000 units from 29,700,000 sold for replacement purposes in 1936, giving a gain of 1.0 per cent. Sales of original equipment, however, dropped 20.8 per cent, from 28,416,000 tires for 1936 to 22,500,000 for 1937. This reduction lowered total 1937 sales to 52,500,000 tires, or a decrease of 9.7 per cent from the 58,116,000 sold in 1936. Replacement sales for 1938 have been set at about 31,000,000 tires.

Production and shipments of automobile tires (casings) for the nine months of 1937 went to an eight-year high, according to the compilations of the Rubber Manufacturers' Association, Inc. Due to the shift in reporting on a quarterly, rather than a monthly, basis, the latest totals available were to the end of September. Production of tires for this period rose 5.9 per cent from the 1936 comparative to 45,221,237 units. Shipments for the three quarters of 1937 totalled 44,582,251 tires, a gain of 6.1 per cent over 1936.

Instead of the 70 per cent base of production allowed for the first quarter of 1938, the rubber export quota of the cartel countries of the Malay Peninsula and the Dutch East Indies was reduced to 60 per cent for the second one. This cut, ordered by the International Rubber Regulation Committee on January 25, was calculated to lower second-quarter crude rubber output to 194,287 tons from the 226,669 tons to be released during the first quarter.

Consumption Under 1936 Comparative

January consumption running farther behind that of a year ago caused the quota cut. Since June, 1937, monthly consumption of crude rubber went under the 1936 comparative. From the highest monthly figure on record of 54,064 long tons for March, 1937, consumption had dwindled to 29,160 by December. Despite this six-month shrinkage, total 1937 consumption of 543,000 long tons was but 5.5 per cent under the peak of 575,000 consumed in 1936.

Estimate of the Rubber Manufacturers' Association, Inc., placed total domestic stocks of crude rubber on hand December 31, 1937, at 256,618 long tons. The latter total was 17.9 per cent larger than the 217,586 a month earlier, and 15.1 per cent more than the 223,000 long tons held on December 31, 1936. The 1937 year-end stocks would be sufficient for nearly nine months' requirements, figured at the December, 1937, rate of consumption.

Revision in prices of the various rubber products during 1937 generally was upward, although the advance trailed the rise in labor and material costs. The average of quotations ranged from 5 to 15 per cent higher than at the close of 1936. During the opening month of 1938, the level held steady, despite isolated instances of minor reductions.

On November 1, price of automobile tires was increased for the third time during 1937. The previous advances were on March 13 and January 10. The November mark-up was 2 per cent on first and second-line tires, and 6 per cent on thirds. This cut the spread between first and third lines, the latter having sold about 37 per cent under the former.

Decreases of 3 to 14 per cent were listed in mid-winter catalogues of mail-order houses. Manufacturers planned no reductions, as dealers practically were guaranteed against a decline from "spring dating" prices quoted during November. The 1937 tire-price average was up only 32 per cent from the 1932 low, despite the rise of 584 per cent in crude rubber.

For the full year of 1937 only 2 applications were filed by concerns in the rubber goods industry for reorganization under Section 77-B. Both were by manufacturers, contrasting with 3 for 1936 and 4 for 1935. For 1934 there also were 2 cases listed for manufacturers and 1 for a retailer, which brought total applications for the four years to 12.

Plicote Laboratory Paints

A SERIES of coatings for the protection of metal, wood or concrete against corrosion and deterioration from exposure to moisture, acids, alkalis, and many other disintegrating elements found in the laboratory, are being distributed by the Fisher Scientific Company, Pittsburgh, Penna. Known as Plicote Laboratory Paints, these coatings have a rubber derivative base which is said to possess practically all of the advantages of rubber minus some of its disadvantages. The derivative contains more than 92% by weight of rubber hydrocarbon and is one of several developed by the Goodyear Tire and Rubber Company.

Extreme hardness and density of film are described as being the notable characteristics of Plicote. After reaching the maximum degree of hardness (in about 10 days) oxidation is complete and the film does not continue to harden. Plicote is also said to be applicable to surfaces subject to bending, expansion or contraction. After light metal is coated with it, the metal can be fabricated without danger of the film cracking or flaking off. The luster of film varies with the type of coating: Aluminum Plicote has a reflective factor of 61%, while White Plicote has one of 68%. These variations are important where light conditions are poor. Because of the rapid evaporation of the solvents used in the coatings, Plicote has no objectionable odors nor harmful fumes during application.

Pigments in the new coating settle very slowly and therefore frequent agitation during application is not necessary. The pigments do not form a hard cake even upon long standing, but produce a gelatinous mass that is said to redisperse readily when stirred. Plicote will cover on an average from 50 to 75% more area than will oil paints, according to the Fisher concern. It can be applied by spraying, brushing or dipping, and levels readily. It can be applied to clean, dry surfaces in the coldest weather.

Special features claimed for the new coating include the following: successfully repels water, whether as intermittent mist, spray or rain, or of constant immersion; can be used to waterproof concrete; resistant to deterioration from heat; bakes to a hard, glossy finish that is easily kept clean; gives satisfactory service on drying racks, ovens, heaters, sterilizers and other surfaces subject to high heat; and effectively resists abrasion because of its hardness characteristic. It is also said to prevent dusting, thus preventing surface deterioration.

"Rubtex" Rubber Products

POSSESSING many interesting properties, a line of rubber products has been recently introduced to the English market under the generic name of "Rubtex." Although various grades of Rubtex have been known in France for some time an English company, called Rubtex, Ltd., with headquarters in London, was recently formed and has taken over the French organization which formerly sponsored the products.

Fundamentally, Rubtex is a reclaimed rubber compound specially treated so that it possesses exceptional properties of adhesion and elasticity. As noted, it is available in several forms. In the solid form it is said to make a strong, almost unbreakable bond when used as a jointing material for concrete, metal and wood. One of its most important uses in this form is for waterproofing and repairing dams, reservoirs, cisterns and railway tunnels. It also serves as a sound-deadening material for railway tunnels. It may also be used as a binding material for stone slabs and tiles, according to its manufacturers.

In France, the solid form of Rubtex has proved successful as a road surfacing material and experiments are now being conducted in England to provide a suitable covering for wooden paving blocks. These blocks are now impregnated with creosote to prevent the wood from rotting, but the creosote dissolves asphalt, generally used for road covering, and the cover on the blocks frequently becomes loose, requiring constant repairs. Rubtex is not soluble in cresote and provides an almost permanent carpet because of its adhesive qualities.

In liquid form, Rubtex is used as a non-decorative paint, which is both waterproof and acid-resisting, and which protects iron, concrete, wood and masonry against corrosion. It is said to be particularly suitable for the protection of submerged or underground structures, being highly resistant to sea water and giving protection to concrete or brickwork in soils with a high salt content. The liquid form may be applied by brushing or spraying. It is not intended as a paint for outside work and cannot be exposed to the sun.

A special putty form of Rubtex has also been made available to give glaziers a material which is adhesive, non-drying, elastic and waterproof, and which can be easily removed when necessary. Besides its glazing use, the putty form can also be used for making watertight joints between asbestos-cement sheets, as it allows for the movement by expansion of the sheets.

Several types of Rubtex chlorinated rubber paints have been developed. One of these is specially suited as a foundation coating for containers of all materials which are liable to shock or vibration during transport; another affords protection to all objects made of metal or concrete against the deteriorating effects of acids, salts, alcohols, etc.; while still another is said to be immune to aggressive gases, smoke, sea water, etc.

New Absorbent Paper

OF possible interest to rubber manufacturers is a new type of paper which is both absorbent and tough when wet. In appearance it is similar to a high grade bond paper, or even a parchment. It can be sloshed around in water and washed with soap and water, the severest test for any paper. Boiled in water for hour after hour it does not fall apart or disintegrate, according to the manufacturer. Evidence of the new paper's strength was recently dramatically demonstrated: A sheet of paper, with the end heavily weighted down, was suspended from the ceiling and a steady stream of water played on it for five days. At the end of the fifth day the paper was taken down and, though thoroughly soaked, was apparently as strong as when first suspended. Tested between the fingers, it did not roll or scuff. Samples of the new paper may be obtained from the manufacturer, the H. P. Smith Paper Company, 1130 West 37th Street, Chicago, Illinois.

To Owners of Noble's "Latex in Industry"

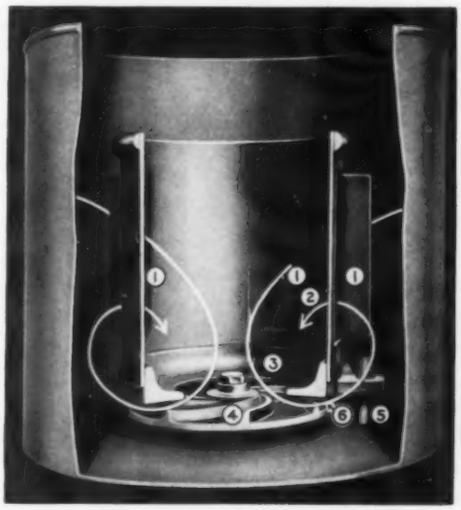
(Purchased Prior to November, 1937)

The author has prepared an addenda and errata list which represents not only errors in patent numbers and typography but which includes a number of references originally omitted from the book. This list, in printed form which may be readily pasted into the original copy, is available without cost. Address requests to THE RUBBER AGE, 250 West 57th Street, New York City.

New Equipment

Continental Mixers and Ball Mills

A NEW and complete line of patented mixers and ball and pebble mills, built in standard steel and stainless steel as preferred, has been introduced by the Continental Machinery Company, 277 Broadway, New York City. The mixers are suitable for grinding,



Section of Continental Mixer

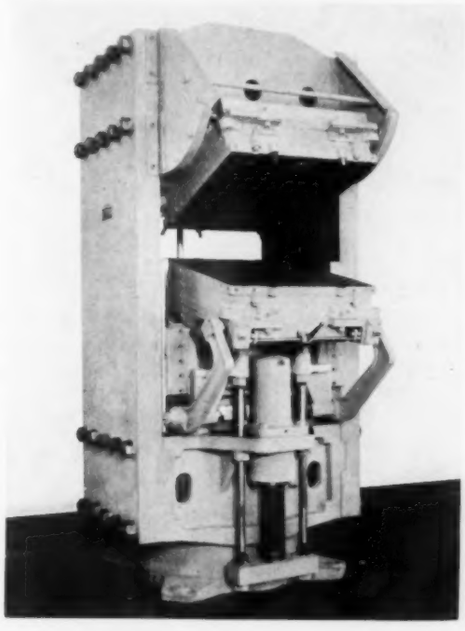
dispersing, dissolving and emulsifying operations, while the ball and pebble mills are especially adapted for making dispersions for latex compounding. An interesting feature of the new mixers is the ease of mixing under vacuum or pressure, making them ideal for de-airing or evaporating fumes in the manufacture of rubber cements. The mixers are distinguished by an entirely new mixing principle which is indicated in the

Continental Ball Mill

accompanying illustration. The mixer utilizes the centrifugal force developed by the mixing disc with curved radial ribs (4) rotating at high speed horizontally at the bottom of the container. The material being treated is forced through a narrow aperture (6) between the mixing disc and the stationary mixing hopper (2), thereby disintegrating and dispersing the material to a finely divided and homogeneous state. The material is then impelled upward by a spiral circulating action that pervades the entire charge, this circulating movement being set up outside the cylinder (5) and between it and the inner wall of the container or tank. The vertical slots (1) in the cylinder have an outwardly projecting baffle directed against the flow of the material and through these slots the material is partly absorbed into the mixing hopper and forced downward against the curved stator ring (3) to the ribbed mixing disc. The remaining material flows over the rim of the open top of the mixing hopper. The new mixers are available in sizes up to 330 gallon capacity. The new Continental ball and pebble mills, also illustrated, are of the batch or intermittent type, the cylinder being approximately half-filled with either flint pebbles or porcelain balls. Special advantages claimed for them include: material is pulverized and mixed in one operation; mill is hermetically sealed; contamination of product being ground is prevented; and no attention need be paid the equipment while in operation. The new mills are equipped with tight and loose pulleys mounted directly on main shaft also with belt shifter. They can be supplied with roller chain drive operating direct from a gear-in-head motor. They are available in sizes up to 45-inch diameter for capacities up to 144 gallons.

Lake Erie Molding Press

A NEW automatic hydraulic molding press for quantity production of molded rubber and plastic parts at low unit cost has been announced by the Lake Erie Engineering Corporation, Kenmore Station, Buffalo, N. Y. It is of the tilting head type with automatic multiple ejection of the molded forms.



Models are available with either self-contained pump or for accumulator operation. The new press has a rated capacity of 1,000 tons for molds measuring 38 x 38 inches. The automatic operation is said to make it possible for one operator to run four presses. It is suitable for molding a wide variety of mechanical rubber goods.

Improved Span Grinding Mill

AN improved model of the Span Grinding Mill, specially designed to reduce soft and hard rubber scrap to fine powder form, has been introduced by M. Pancorbo, 155 John Street, New York City. The new model is equipped with a vibrating screen. Since the

vibrator is mounted on the machine, no additional floor space is required by the new type grinder. In operating the new model, the material to be ground is blown through a cyclone collector and discharged into the vibrating screen. Any oversized particles go back into the hopper for additional grinding and therefore the finished product is 100% uniform in particle size. The vibrating device can be furnished with a screen of any desired mesh. In addition to the uniformity of rubber dust obtained, the new model has other advantages. The grinding operation is said to be dust-free, while the finished product comes out cool and in loose powder form thus eliminating the danger of spontaneous combustion. The rubber dust is discharged directly into bags or containers. Labor cost is said to be reduced to a minimum with the new grinding mill which is featured by compact construction.

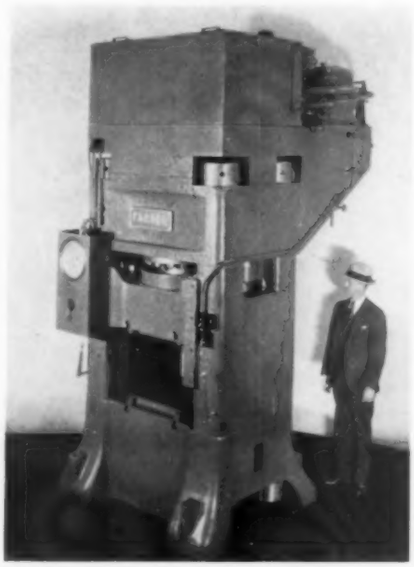
Celectray Throttling Controller

ECONOMICAL means for obtaining throttling control of electric furnaces and ovens are now available in the new Celectray Indicating Photoelectric Con-

troller, according to its manufacturer, the C. J. Tagliabue Mfg. Co., Park and Nostrand Avenues, Brooklyn, N. Y. With this instrument, no other equipment is required than is ordinarily used for on-and-off control. The new instrument is an indicating potentiometric controller with photoelectric detection of the position of a light-beam reflected from a mirror galvanometer toward a reciprocating "controlling edge." With it, the heat supply is made to vary inversely as the temperature. The throttling zone can be readily adjusted within wide limits and the "load error" commonly met with in throttling controllers can be kept within a few degrees without introducing appreciable hunting, according to Tagliabue. Adjustment for "load error" is provided in the instrument. The circular scale and slide wire are 15 inches long and temperatures can be read within the accuracy of 0.1% of the range. Temperatures are indicated by brilliant white, red or green lines of light on ground glass, the lines being visible at a great distance.

Farrel Hydraulic Molding Press

ESPECIALLY built for the molding of automotive brake blocks, a new hydraulic molding press has been introduced by the Farrel-Birmingham Co., Inc., Ansonia, Conn. The new press, which is of the self-contained, individually-powered type, has a maximum capacity of 500 tons, with one down-acting 21-inch diameter ram and two 6⅛-inch double-acting cylinders mounted in the top crosshead and working under an initial pressure of 2,600 pounds per square inch. It has a maximum opening of 24 inches and a maximum stroke of 24 inches. The platen area is 38 x 31 inches. Both the bottom and moving crossheads are provided



with tee slots for the attachment of molds. The power unit is a 23.8 gallon-per-minute radial piston pump. The control panel provides for pressure regulation over a range from 10 to 500 tons. This range of pressures has an infinite variation from minimum to maximum by means of a selective pressure system. Any ten pressures in this range may be set for immediate selection. The dwell of the selected pressure on the work may be automatically timed over a range from 2 to 40 seconds by an automatic timing device. A working cycle of the press is effected by push button control.

Book Reviews

Modern Rubber Chemistry. By Harry Barron. Printed in Great Britain. Available from Chemical Publishing Co., 148 Lafayette St., New York City. 5½ x 8½ in. 342 pp. $7.50.

Divided into twenty-five chapters, this book attempts to cover the complete range of rubber chemistry and bring it up to date. Data is presented on the history, sources, structure, uses, etc., of crude rubber and latex; physical and chemical properties of rubber; compounding; vulcanization; and testing. In addition there are chapters on reclaimed rubber, hard rubber and the so-called synthetic rubbers. Naturally, it is impossible to thoroughly treat such an extensive subject in a mere 342 pages and thoroughness is often surrendered to brevity. Despite this, however, Dr. Barron delves deeply into both the theoretical and practical aspects of rubber chemistry. Insofar as possible, he has simplified the language of chemistry and, as he states in his preface, in order to be more fully understood he has "resorted to analogies which, if perhaps too popular for the truly scientific mind, may yet be understood by the much wider public interested in rubber." Chemistry, he claims, suffers as a whole from too much unexplained jargon. The book has complete author and subject indexes, and there are 470 references to patents and literature. Although of interest to experienced rubber chemists and technologists, this book has particular appeal to the uninitiated and to the student.

•

George Westinghouse. Published by the American Society of Mechanical Engineers, 29 West 39th St., New York City. 7½ x 11 in. 78 pp.

On December 1, 1936, the American Society of Mechanical Engineers sponsored the Westinghouse Commemoration as a feature of its annual meeting. The occasion was the ninetieth birthday of George Westinghouse and this book contains a number of papers delivered at the commemoration exercises. In a literal sense, the book tells the story of electricity which is practically synonymous with the name of Westinghouse. The papers reproduced were prepared for the most part by eye-witnesses of the struggle to introduce the alternating current system in this country. Biographical in nature, it makes interesting reading.

Booklets, Catalogs, etc.

News About DuPont Rubber Chemicals. (Jan. 12, 1938). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 6¼ x 9½ in.

This edition of the DuPont house organ contains a laboratory report (No. 38-1) on "The Limitations of Rubber. I. Influence of Oxygen," in addition to three reprints, *i.e.*, Water Resistance of Neoprene, from *Industrial & Engineering Chemistry;* Softening Agents in Neoprene, from *India Rubber World;* and Things Are Not What They Seem, from *Popular Mechanics.* An index, both by laboratory report and subject, to the company's rubber chemicals literature, is also included.

•

Functions of the Personnel Director. Policyholders Service Bureau, Metropolitan Life Insurance Co., New York City. 5¼ x 7¾ in. 38 pp.

The data presented in this report is based on information obtained from 80 companies in a variety of fields, including that of rubber. The personnel policies and programs of leading companies are outlined, the place of the personnel director in industry and business today is described, and how personnel departments are organized is indicated. The true functions of the personnel director are thoroughly covered.

What Can Industry Do About Unemployment? (No. 23). **The Peril of Wage and Hour Legislation.** (No. 24). By Allen W. Rucker, in collaboration with N. W. Pickering. Farrel-Birmingham Co., Inc., Ansonia, Conn. 3-3/4 x 7 in. 16 pp. each.

The subject matter of these two booklets, 23rd and 24th in the series of booklet-editorials written by the co-authors, is indicated by the respective titles. Regarding unemployment, they make the claim that some 67,000 new manufacturing plants will be needed to provide jobs for available factory labor and stress the point that unless more goods are produced no possible increase in dollar wages will raise the standard of living. Regarding wage and hour legislation the authors charge that the Black-Connery Bill "can succeed only in bringing down the ceiling of annual incomes and labor's yearly purchasing power." They give the term "wages" four different interpretations, i. e., the differential wage rate, the average annual dollar income, the purchasing power of the dollar income, and labor's percentage share of industrial income.

•

Heat. Johns-Manville Co., 22 East 40th St., New York City. 6 x 9 in. 48 pp.

Designed to be helpful and informative to the engineer, yet written in the language of the layman, this booklet, divided into five chapters for easy reference, thoroughly covers the subject of heat. History, definition, the three methods of heat transfer, accomplishments in heat conservation, and modern materials available for conserving heat, together with specific uses of these materials, are all covered. More than 70 charts, photographs and drawings are included.

•

Laboratory Instruments—Chemical and Biological. (Catalog No. 38). American Instrument Co., Inc., Silver Spring, Md. 8½ x 11 inches. 98 pp.

The company's complete line of laboratory instruments and apparatus, from absorption cells to weighing balances, is illustrated and described in this catalog. In addition, the catalog contains a section designed to act as a guide to laboratory workers who wish to equip constant temperature baths or ovens with the most suitable controls. Choice of thermoregulators, choice of relays, and choice and calculation of heaters are discussed.

•

Twenty-Five Years. Atlas Powder Co., Wilmington, Delaware. 7 x 10 in. 64 pp.

Published on the occasion of the twenty-fifth anniversary of the Atlas Powder Company, this booklet reviews the early struggles of the concern to secure a foothold in the industrial market, describes the wide range of products it now manufactures, and pays tribute to the loyal employees who made its progress possible. Activities of the Zapon Division, which produces rubber coated fabrics among other products, are included.

•

Santoflex B. Rubber Service Laboratories Division, Monsanto Chemical Co., Second National Bldg., Akron, Ohio. 4 x 7 in. 42 pp.

The composition, specifications, general properties and uses of Santoflex B, the new antioxidant developed by the company, are described in this booklet. Special advantages claimed for it are also given. In addition, the booklet contains the results of a number of tests showing the comparison of antioxidants in various stocks.

•

Modern Hydraulic Presses. Hydraulic Press Division, French Oil Mill Machinery Co., Piqua, Ohio. 8½ x 11 in. 20 pp.

Using large blown-up illustrations with short but clear descriptions, this catalog indicates the type of hydraulic presses and hydraulic press controls built by the company over a period of years, many of them specially constructed to meet a specific industrial need. Presses used by Firestone and Goodyear are pictured.

Editorial Comment

Tire and Tube Excise Taxes

FOR some reason, best known to the legislators at Washington, tires and tubes are considered luxury items. This classification is applied to the two major products of the rubber industry in the law which authorized the special excise taxes. As far as these taxes go, tires and tubes are categoried with such products as liquor and tobacco, both of which are either taxed as luxuries or heavily taxed as a means of regulation. It is difficult to see how even congressional tax drafters can place such a definition on tires and tubes in this highly motorized era when they play such an important role in commerce and industry.

During 1937, the tax on tires and tubes produced $40,819,000 for the Federal treasury. Only four other products produced greater revenues for the government—liquor, tobacco, gasoline and motor vehicles. In fact, the tire and tube tax was nearly half as productive as the tax on motor vehicles. Think of the price differential between these items! Even despite the total number of units involved, the unfairness of the taxes can be realized.

Although tires and tubes are grouped with automobile parts and accessories in the regulations pertaining to the excise taxes, a special clause excludes them from the regular rates fixed for such products. This rate is 2% of the wholesale price of parts and accessories. As William Finger, representing the Rubber Manufacturers Association, recently pointed out to a special committee in Washington, tire manufacturers paid excise taxes of $25,722,910 during the first nine months of 1937, *or 7.7% of the total wholesale value.* Certainly, tires and tubes are nothing more or less than automobile accessories and the tax rate on them should not be almost four times that applied to other accessories. Granting that they are the most important accessories on automobiles, the tax differential should still not be so great.

The rubber industry as a whole is not seeking to avoid its tax responsibilities. It does not clamor for elimination of the excise taxes on tires and tubes, although there is one industrial faction that believes elimination of the excise taxes on essential commodities and a broadened income tax base is the answer to the government's taxation problem. The rubber industry is merely requesting the government's cooperation to the extent of reducing the excise tax on tires and tubes to bring it more in line with the excises on similar commodities. This request should certainly be granted—even by legislators who classify tires and tubes as "luxury items."

•

Second Quarter Export Quotas

WHEN the International Rubber Regulation Committee was first organized to oversee the operation of the restriction scheme, surprise was expressed in many quarters that the United States—the biggest customer of the rubber growing countries—had no voice in the decisions of the Committee. It is true that an American delegate is permitted to sit in at these meetings, but he has no vote and literally "speaks only when spoken to." In the light of recent events, this situation seems still more surprising.

Last month the Regulation Committee lowered permissible exports from signatory countries to 60% of the basic quota for the second quarter of the current year—a drop of 10% from the prevailing 70% figure. This drastic cut is laid directly to the door of the American rubber industry which is just now casting off the reins which have retarded production for the past several months and which were responsible for lowered consumption figures. No other interpretation can be given the drop in permissible quotas for the second quarter of the year in view of the fact that while the total amount of rubber consumed by American manufacturers in 1937 was less than that consumed in the previous year, it is estimated that European consumption showed an increase.

Although American delegates to the meetings of the Regulation Committee are most discreet and make few public statements, it is understood that at the meeting at which the quota for the second quarter of the year was cut to 60%, the point was raised that American consumption in that period would in all probability be restored to normal levels and a cut in the quota would mean lowered available stocks which, in turn, inevitably means a higher price for rubber. Although the wisdom or folly of the drastic cut cannot be determined until the second quarter of the year has come and gone, the fact remains that the American viewpoint differed from the actual decision. Given a voice and a vote, the viewpoint might have had more emphasis.

CURRENT • NEWS
of the Rubber Industry

FEBRUARY, 1938

RUBBER QUOTA IS LOWERED TO 60%

Permissible Exports for Second Quarter of 1938 Sets a Record Low Since Inauguration of the International Restriction Plan

Meeting in London on January 25, the International Rubber Regulation Committee cut the rubber quota for signatory countries to 60% of basic allotments for the second quarter of the current year. This is a reduction of approximately 22% from the 1937 levels in shipments of rubber, and 10% below the permissible quota for the first quarter of 1938. During the second half of last year the quota was firm at 90% of basic figures.

Under the 60% quota, permissible exports from countries participating in the restriction scheme will amount to approximately 64,763 tons per month as compared with monthly shipments of 75,557 tons for the January-March, 1938, period under a 70% quota. On a quarterly basis, permissible shipments for the second quarter of the year will amount to about 194,286 tons as against 226,669 tons in the first quarter.

1,154,000 Tons Shipped in 1937

These figures do not include shipments from Siam and Indo-China, both of which operate under special rules. Shipments from these two countries, plus those from non-signatory countries, will probably add another 50,000 tons to the total for the first half of the current year, making for an approximate grand total of 471,000 tons for that period. Although final figures are not yet available, it is estimated that total world shipments during 1937 from all rubber growing countries amounted to approximately 1,154,000 tons.

In fixing the quota for the second quarter of the year the Regulation Committee was faced with the necessity of estimating the probable rate of world consumption for that period, an extremely difficult undertaking in view of recent circumstances. Consumption in the United States fell off sharply toward the end of 1937, the December figure being approximately 4,800 tons lower than the preceding month. The consumption rate in the next few months depends almost entirely on the expected pick-up in general business. On the other hand, consumption has been increasing abroad, particularly in the United Kingdom where a 44% increase was recorded for the first eleven months of 1937 as compared with the similar period in the preceding year.

Although the action of the Committee in dropping the quota to 60% was hailed by most American tire manufacturers as a support to the existing tire price level, some concern has been expressed that if the expected pick-up in business does occur by March or April the sharply curtailed shipments during the second quarter of the year might result in a tight situation. If consumption increases to compare with 1937 levels then the question of available stocks might become acute and result in a climbing price for rubber.

This view is given added strength by the fact that the second quarter of the year generally compares more favorably than the preceding quarter since replacement tire sales are always at low ebb during the winter and generally pick up early in the spring. The replacement market this year is expected to assume favorable proportions.

Latex-Coated Seeds

Greater yield, better germination, early growth, and fewer operations in crop growing are claimed for latex-coated seeds recently introduced in England. Before being planted, the seeds are covered with a layer of latex in which is mixed fertilizers, fungicides to kill parasites, and bacteria of a variety that is said to convert nitrogen from the air into a form which can be used by growing plants. The latex covering is described as being porous enough to let moisture and air penetrate to the seed.

Thiokol Closes Plant

It is understood that the Thiokol Corporation has closed its plant at Yardville, New Jersey, and that "Thiokol," the company's polysulphide rubber product, will henceforth be manufactured at Midland, Michigan. It is also understood that the sales and research force will be maintained in New Jersey. Bevis Longstreth is president of the company and Dr. J. C. Patrick is chief chemist.

1937 CONSUMPTION FALLS BELOW 1936

Drop of 32,053 Tons is Reported by Rubber Manufacturers Association in Domestic Consumption of Crude; Gain Shown by Reclaim

Consumption of crude rubber by manufacturers in the United States during the year 1937 is estimated to have been 542,947 long tons, as compared with 575,000 (revised) long tons consumed during the preceding year, according to figures compiled by the Rubber Manufacturers Association. Consumption of reclaimed rubber during the past year, however, amounted to 157,990 tons as compared with 141,486 tons during 1936. Consumption of crude for December, 1937, is estimated at 29,160 tons, which compares with 33,984 tons for November and 49,754 tons for December, 1936.

Gross imports of crude rubber for 1937 are reported at 584,851 tons against 490,859 tons in the preceding year. Gross imports for December, 1937, are estimated at 68,305 tons, comparing with 56,302 tons for November and 57,049 tons for December, 1936.

Figures on Total Domestic Stocks

Total domestic stocks of crude rubber on hand on December 31, 1937, are estimated at 256,618 tons, as compared with 217,586 tons on hand on November 30 and 223,000 tons on hand a year ago. Crude rubber afloat to United States ports as of December 31, 1937, is estimated at 63,099 tons, which compares with 81,302 tons afloat on November 30 and 56,567 tons afloat on December 31, 1936.

Reclaimed rubber production during 1937 is estimated at 178,776 tons as compared with 150,571 tons during 1936. December reclaimed rubber consumption is estimated at 7,674 tons; production at 10,815 tons; and stocks on hand on December 31 at 26,260 tons.

The complete figures on domestic consumption for the year of 1937, plus estimates for the first six months of the current year, were partly responsible for the lowering of permissible shipments from countries involved in the restriction scheme for the second quarter of the year. Details of this cut, which amounted to 10%, are given elsewhere in this issue.

HARVEY S. FIRESTONE, SR., DIES AT 69

Harvey S. Firestone, Sr., chairman of the board of the Firestone Tire and Rubber Company and head of the vast Firestone enterprises, died in his sleep on February 7 while vacationing at Harbel Villa, his winter home in Miami Beach, Florida. Death was attributed to a coronary thrombosis. Only one son, Russel A. Firestone, was with him at the time of his death. He had arrived in Miami Beach in time to celebrate his 69th birthday on December 20.

Mr. Firestone was born on a farm near Columbiana, Ohio, in 1868. Although his family had tilled the Ohio soil for four generations, the young Harvey Firestone had a leaning toward commerce rather than agriculture, and therefore took a course at the Spencerian School of Commercial Accounts and Finance in Cleveland after being graduated from the local high school. His first two business ventures were not encouraging. A coal dealer who hired him on his first job to keep books failed shortly thereafter, and his subsequent selling of flavoring extracts and patent medicines did not turn out so well. His third job, however, selling buggies in Detroit, launched him on his successful career.

Entered Tire Business in 1896

Convinced there was a future in tires —the buggy he drove in Detroit was the only one equipped with solid rubber tires in town—Mr. Firestone moved to Chicago in 1896 and with a partner organized the Firestone-Victor Rubber Company. The new company, of which Mr. Firestone was president, represented an investment of $2,000. It set up operations in an old run-down factory. The business consisted of cutting up strips of solid rubber into lengths required for buggy wheels, the strips being cemented together to form tires. By reason of mergers, consolidations and buying out competitors, the company soon became the leader of its field. Despite this, however, personal profits were slim and therefore Mr. Firestone sold his interest in 1899 for the surprising price of $45,000. He was only thirty-one years old at the time.

Against the advice of his friends, Mr. Firestone went to Akron in 1900 and together with James Christy, Jr., J. A. Sweinhart, and Dr. L. E. Sisler he founded the Firestone Tire and Rubber Company with $20,000 in cash as capital and $30,000 worth of patents and good will. Originally, the company was a sales agency only, selling a private brand solid rubber buggy tire made by another concern, but in two years the company had increased its capitalization to $200,000 and began the production of its own tires in a remodeled machine shop.

Instead of following the practice then in vogue of molding each tire to buggy wheels, Mr. Firestone introduced the practice of making these tires from continuous lengths of rubber, similar to the manufacture of rubber hose. He quickly adopted the pneumatic type of tire when it was introduced and since he could not produce the clincher type because of patent difficulties he developed his own type of pneumatic tire fastened to the rim with removable side rings. The rapid development of the automobile in the early 1900's was matched by the expansion of the Firestone interests. In 1905 Harvey Firestone personally sold Henry Ford 2,000 sets of tires and this sale is credited with launching the lifetime friendship which existed between these two industrial leaders.

The story of Harvey Firestone is the story of the Firestone company. In 1911, with capital and surplus increased to $4,500,000, a new plant was constructed capable of turning out 12,000 tires a day. By the early 1920's the concern had assets of more than $70,000,000 and was earning approximately $9,000,000 a year. Leaving the business in other hands, Mr. Firestone went to England for an extended vacation, but the break in the rubber market around 1922-23 caused by the Stevenson Restriction Scheme brought him back to Akron where he found the company had increased its indebtedness to the banks, could raise no more funds, and was in a precarious state. He resumed active control and in a few years had restored the company to a solid footing. In 1926, in conjunction with Samuel Crowther, he wrote a book, "Men and Rubber," in which he told how he brought order out of chaos.

Acquired Liberian Privileges

It was during the turbulent days of the Stevenson plan that Mr. Firestone led an investigation of potential rubber producing areas other than those in the Far East controlled by English and Dutch interests. This investigation resulted in the acquisition of 2,000 acres by the company in Liberia in 1924. By means of a special arrangement with the Liberian government, which included a loan of $5,000,000, Mr. Firestone was enabled to lease 1,000,000 acres in 1926 for ninety-nine years. This acreage is now in production and shipments of rubber were started two years ago.

Mr. Firestone remained as head of the Firestone Tire and Rubber Company until 1932 when he became chairman of the board and was succeeded in the presidency by John W. Thomas. A majority of the stock in the firm, as well as in its more than two dozen subsidiaries, has always been controlled by the Firestone family.

During the World War Mr. Firestone was instrumental in organizing the rubber division of the War Industries Board. He also served as president of the Rubber Association of America during 1916-1918 and guided the activities of that organization toward war work as well. Mr. Firestone was one of a quartet of famous men, all nature lovers, who enjoyed vacations together for years. The others were John Burroughs, the naturalist who died in 1921, Henry Ford, and Thomas A. Edison. Mr. Firestone's death leaves Mr. Ford as the only remaining member of that quartet.

Naturally, Mr. Firestone was an executive and a director in a large number of firms. He was also a director of many technical and chemical societies, including the A.C.S., A.S.T.M. and the S.A.E. He never completely lost interest in farming and one of his chief hobbies was raising blooded stock. He was a member of numerous clubs in all parts of the country. From 1920 to 1927 he provided an annual scholarship of four years in college to the high school student writing the best essay on good roads and highway transportation. He was interested in the church and at one time served as president of the Ohio Federation of Churches. He was also a consistent contributor to various charitable organizations.

GUTTA PERCHA, LTD., TO MAKE HARD RUBBER

An arrangement has been completed between Gutta Percha & Rubber, Ltd., Toronto, Canada, and the American Hard Rubber Company, New York City, whereby the Canadian concern will manufacture and sell a complete line of hard rubber equipment and rubber linings for use in the chemical process industries in Canada and other countries. The long experience of the American firm has been placed at the disposal of the Canadian organization.

Gutta Percha & Rubber, Ltd., has been specializing in industrial rubber equipment, including hose, belting and specialties, and a high percentage of the company's business has been relegated to the industrial field. The decision to manufacture hard rubber products was a logical one and should result in the wider sale of such goods in the Canadian market. Facilities for manufacturing hard rubber products have already been provided in the Toronto factory.

EXPLOSIONS WRECK NEOPRENE FACTORY

A series of explosions in a divinylacetylene tank, believed to have been caused by friction which ignited gas leaking from a pipe line, wrecked the acetylene polymerization building of the Deepwater, New Jersey, factory of E. I du Pont de Nemours & Co., Inc., on January 24. A full crew was at work at the time and although most of the men escaped unharmed, three lost their lives in the blast. DuPont manufactures neoprene at Deepwater.

Although divinylacetylene is a by-product which does not enter the manufacture of neoprene, the damage to the building and equipment must be repaired before the production of the company's synthetic rubber can be resumed. An adjoining building, in which chloroprene is converted into neoprene, was damaged only slightly. However, repairs are expected to require three months. In a statement issued after the blast, the company expressed the belief that it could rebuild in such a manner as to prevent a similar accident in the future and stated that it would take the further precaution of isolating the equipment so that if an explosion should occur, the extent of the damage could not be such as to hold up production for more than a few days.

At the time of the explosion DuPont had available a limited stock of neoprene and in order to spread its use during the current emergency period to the best possible advantage of both users and manufacturers of neoprene products the company has adopted a program whereby 75% of the stock will be allotted to various customers in the same proportion that their consumption during the past six months has borne to the company's total shipments, while the remaining 25% of stock will be reserved for manufacturers who are using neoprene principally for essential purposes, such as the production of neoprene products which are used in applications where they cannot be replaced by any other material without completely redesigning the machine or equipment of which they form a part or parts.

In a letter to the industry, E. R. Bridgwater, manager of the Rubber Chemicals Division of DuPont, urged the company's customers who are using neoprene for purposes that might be classed as non-essential to give the company permission to use their allotment for shipment to others who may have more urgent need of the material. In similar vein, he invited customers to communicate the facts to DuPont in the event their allotments were insufficient to enable them to supply those customers who cannot dispense with neoprene products.

Enlarge Foreign Trade Notes

During the past two years, the Bureau of Foreign and Domestic Commerce, through the Leather and Rubber Division, has been issuing at irregular intervals circulars relating to foreign trade in tires and other rubber manufactures. The Division has now decided to broaden this service and in the future will issue a monthly bulletin under the title "Rubber Products Foreign Trade Notes." Occasionally, special supplements will also be issued. The new monthly service is subject to a subscription charge of $1.00 annually for domestic manufacturers, and $2.00 for foreign subscribers.

JAPANESE SALES TERMED NEGLIGIBLE

Although the growth of the rubber industry in Japan has been exceptionally rapid and that country has assumed an important position from a rubber consumption viewpoint, its total production is still minor as compared with the United States and Great Britain and the sale of Japanese rubber products in this country is practically negligible, according to Press Bergin, business writer and authority.

According to Department of Commerce figures, Japan exported approximately $8,000,000 worth of finished rubber products in the first six months of 1937 which was about 35% more than the value of exports in the corresponding period in the previous year. It is not yet known what percentage of that value in terms of products was imported into the United States, but based on the percentage figures for previous years it is estimated that approximately $900,000 worth of Japanese goods were imported in 1937. In comparison with the total value of all rubber products manufactured and sold in this country, the total of Japanese imports is negligible.

Mr. Bergin also pointed out that in comparison with other industries, such as rayon, toys, chinaware and pottery, the domestic rubber industry has no competition at all from Japan, according to the records.

SYNTHETIC RUBBER FEATURED AT SAE CONVENTION

Thiokol booth at the recent S.A.E. convention in Detroit

Varied displays of chloroprene and polysulfide rubbers were featured by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., and by the Thiokol Corporation, respectively, at the annual meeting of the Society of Automotive Engineers, held at the Book-Cadillac Hotel in Detroit on January 10 to 14. The new 1938 cars have several parts made of the so-called synthetic rubbers. These parts include oil seals, dust covers, booster brake equipment, gas and oil lines, etc. Service station and paint spray hose are among the notable items being used in the automotive servicing field.

TAX CUT REQUESTED ON TIRES AND TUBES

Pointing out that tire manufacturers paid excise taxes of $25,722,910 during the first nine months of 1937, which represented 7.7% of the total wholesale value of the tire output in that period, a plea for an immediate substantial reduction in the present excise taxes on tires and tubes was made before the Ways and Means Committee of the House of Representatives at Washington on January 27 by William L. Finger. Mr. Finger appeared before the committee in his capacity as chairman of the tire manufacturing division of the Rubber Manufacturers Association.

Mr. Finger stressed the fact that the rate on tires is equivalent to approximately 8% of the wholesale value and that on tubes to approximately 12%, as compared with 2% and 3% for similar products. In this connection he stated, "In those cases where the excise tax is set on a percentage basis it is not above 10% in any case and the 10% is limited for the most part to luxury items, on several of which your committee recommends the repeal of the tax. Tires and tubes are in no sense luxury products, but necessities used by workers of all classes and by farmers in their daily work."

In drawing comparisons with other products, Mr. Finger mentioned the fact that tractors and other farm implements are not subject to the excise tax at all and that the most significant development now taking place in the tire industry is the rapid growth in the use of rubber tires for tractors and other farm implements. Although he did not express the belief that, based on this comparison, the tax should be withdrawn altogether on tires and tubes he intimated that a reduction was only fair.

Referring to that section of the law authorizing the excise tax in which tires and tubes are classified as automobile parts and accessories but excludes them from the regular rates fixed for such parts and accessories, Mr. Finger made the claim that tires and tubes are nothing other than automobile accessories and therefore "in logic and in fairness" the rate on them should not be appreciably higher than the regular 2% which applies to products in this category.

In summing up, Mr. Finger asked the committee to give careful consideration to the question as to whether contemplated repeals or reductions on other products would be as beneficial to the people as would a reduction in the disproportionally high excise taxes on tires and tubes which are used by all classes including people in relatively low income groups.

R. I. Meeting Set

The next meeting of the Rhode Island Rubber Club will be held on March 4 at the Narragansett Hotel in Providence. Speakers will include E. I. Kilcup, president, Davol Rubber Co., and Harry R. Moulton, research division, American Optical Co. The Davol Glee Club will entertain.

Seeks Tire Agency

The firm of Jackson's, 24 Clarence Street, Cheltenham, England, is interested in acquiring the sales rights to an American tire for England. At the present time the company is handling various British and Continental makes of tires and tubes, as well as automotive accessories. The company has offered to furnish information on the British market to those interested.

GOODYEAR SPONSORS L. A. GROUP MEETING

An innovation featured the regular monthly meeting of the Los Angeles Group, Rubber Division, A.C.S., held on February 1 at the Mayfair Hotel in Los Angeles. The entire program and all prizes were presented by the Goodyear Tire and Rubber Company. Arrangements were handled by S. H. Fleming. This was the first of a planned series of meetings to be sponsored by the larger rubber companies on the coast. Approximately 128 members and guests attended the meeting.

B. Darrow, formerly in charge of all development work for Goodyear at Akron and now in charge of technical service at Los Angeles, gave a 30 minute talk on "Tire Development." He was followed by R. P. Gaylord who delivered an address on "Tractor Tire Tests." The final Goodyear speaker was Art Sewell, pilot of the Goodyear Blimp, who gave a short talk and showed motion pictures of the blimp in action.

At the business session, a committee was appointed to take under advisement the matter of a permanent board of directors who would have general charge of the activities of the group in the future, a move said to be necessary because of the rapid growth of the group. Al Pickard then announced that a second golf tournament would be held soon because the tournament staged on January 29 was poorly attended because of rain.

Chicago Group to Meet

The Chicago Group, Rubber Division, A.C.S., will hold its next meeting on Friday, February 18, in the College Inn of the Sherman Hotel in Chicago. Dr. C. E. Frick, chief chemist, Van Cleef Brothers, will act as chairman for the evening. The feature attraction of the evening will be the initial presentation of a motion picture entitled "Rubber Reborn." It will be shown through the courtesy of the Midwest Rubber Reclaiming Company, and William Welch, president of that concern, will deliver a short talk prior to the showing of the picture. It is understood that the picture traces the rubber reclaiming process from start to finish. A dinner, to be served at 6:45 P.M. in the College Inn, will precede the meeting.

BOSTON GROUP HOLDS ITS WINTER MEETING

The Boston Group, Rubber Division, A.C.S., held its winter meeting on February 4 at the Fox and Hounds Club in Boston. Approximately 140 members and guests attended the meeting which was featured by three short but excellent addresses, delivered by Roland D. Earle of Angier and Earl, Inc.; Jesse H. Mason, of Haartz-Mason-Grower Co.; and Robert C. Kelley, of Converse Rubber Co., respectively.

In discussing "New Developments in the Manufacture of Rubber Cement," Mr. Earle reviewed the difficulties experienced by various manufacturers with bonding cements several years ago and went on to describe later developments, including the introduction and widespread use of latex cements. He emphasized the importance of non-inflammable cements and described several of the newer types of bonding cements which have been recently introduced.

Mr. Mason, selecting as his subject "Rubber Proofing," discussed the production end of the business and drew upon his twenty-five years of experience in the industry to present a vivid picture to his audience. He compared modern production practices with those in vogue two decades ago, and described some of the machinery. He also stressed the point that no radical or fundamental change had occurred in the production of rubber proofed goods in the past quarter of a century.

The fluctuating price of crude rubber and its effect on the domestic rubber manufacturing industry was the topic selected by Mr. Kelley in his address entitled, "As a Buyer Looks at the Rubber Market." He pointed out that no rubber factory can operate and fix its retail prices on the cost of spot rubber but had to treat with the price of futures. Mr. Kelley also touched on rubber cultivation problems and discussed a fair price for rubber.

Door prizes were distributed during the meeting, made possible by the contributions of the following concerns: Barrett Co., E. I. du Pont de Nemours & Co., Wm. H. Eggleston Co., Ernest Jacoby & Co., Krebs Pigment Co., W. H. Litter Co., H. Muehlstein & Co., Naugatuck Chemical Division of U. S. Rubber Products, Inc., New Jersey Zinc Co., Pequanoc Rubber Co., R. T. Vanderbilt Co., and L. G. Whittemore Co. The next meeting will be held on May 6.

Akron Meets February 18

The Akron Group, Rubber Division, A.C.S., has scheduled its winter meeting for February 18 at the Akron City Club. The featured speaker will be Sidney D. Kirkpatrick, editor of *Chemical & Metallurgical Engineering*, who will discuss "Chemical Engineering Comes of Age." In addition to reviewing developments since 1917, Mr. Kirkpatrick will touch on some of the new and interesting products developed within the past few years.

FINANCIAL NEWS

GENERAL TIRE NETS PROFIT OF $808,913

Based on net sales of $21,392,956, an increase of 19.4% over the net sales of $17,909,886 in the previous year, the General Tire and Rubber Company reports a net profit of $808,913 for the fiscal year ended November 30, 1937, after all charges and after provision for Federal income taxes and surtax on undistributed profits. After dividend requirements on 26,715 shares of 6% preferred stock, the net profit is equivalent to $1.25 per share on the $5-par common stock, which compares with $2.53 in the previous year based on a net profit of $1,291,011.

Current assets were reported at $10,287,211 and current liabilities at $3,119,765, a ratio of 3.3 to 1. Cash on hand as of November 30 totalled $689,055, and notes payable to banks amounted to $2,000,000. The company has no bonds or funded debt. During the year, $127,000 in preferred stock was retired through purchases for sinking fund, reducing the outstanding preferred stock to $2,671,500. The report includes the earnings of the Adora Mills. Several years ago General Tire purchased 50.2% of the common stock of this fabric concern and purchased all of the remaining shares on December 1, 1936. Inventories increased from $4,157,209 to $5,727,953, according to the financial statement.

In a report accompanying the statement to stockholders, President W. O'Neil stated that the results for 1937 were disappointing and attributed the showing to drastic declines in the prices of crude rubber and cotton which necessitated substantial write-offs in inventory, although sales maintained a satisfactory level throughout the year. He also expressed optimism as to the future earning possibilities of the Wabash, Indiana, mechanical goods plant which was placed in operation during the fiscal year.

A. G. Spalding & Bros.

Year ended October 31, 1937: Net loss of $310,866 after depreciation, amortization, interest, taxes and other charges. This compares with a net loss of $912,392 reported for the previous fiscal year. The balance sheet shows current assets of $7,281,984, including $815,003 in cash, as of October 31, and current liabilities of $778,357. The company's capital stock now consists of 33,322 shares of $100-par value, 7% first preferred; 10,000 shares of $100-par, 8% second preferred; and 349,110 shares of no-par value common stock. Cumulative unpaid dividends on the first and second preferred shares now amount to $1,683,457.

Dayton Rubber Mfg. Co.

Year ended October 31, 1937: Net income of $334,834, equal to $1.37 each on 176,839 no-par common shares after annual dividend requirements on the $2 cumulative Class A stock. The report shows an inventory write-down of $220,528; provision of $53,988 for Federal surtax; and provision of $112,632 for loss on purchase commitments. Net income in the preceding year was $510,465, or $2.46 per share on 169,691 shares of common stock then outstanding.

Nieuwland Foundation

To carry on the scientific research which he inaugurated, the University of Notre Dame has established the Julius A. Nieuwland Memorial Foundation. The late Father Nieuwland is credited with the discoveries which made synthetic rubber commercially possible. The immediate objectives of the new Foundation include a chair of organic chemistry, a visiting professors' endowment, a lecture endowment, five research fellowships, a library and research materials fund, and a chemistry laboratory building. An initial gift of $10,000 has been contributed by the Chemical Foundation, Inc. In all, $1,000,000 is required.

Reclaimers Name Officers

At a meeting held in New York City last month, the following officers for 1938 were elected by the Rubber Reclaimers Association: *President*, V. H. Dingmon (Xylos Rubber); *Vice-president*, E. H. Brooks (Goodyear); *Treasurer*, J. P. Coe (Naugatuck Chemical); *Secretary*, Marion B. Miller. The new board of directors includes the following: A. D. Brandt (Philadelphia Rubber Works), Irving Laurie (Somerset Rubber Reclaiming Works), H. S. Royce (Boston Woven Hose), V. H. Dingmon (Xylos Rubber), and William Welch (Midwest Rubber Reclaiming).

Date Set for Filing Claims

Judge C. C. Hincks of the United States District Court for the District of Connecticut has set February 28 as the final date for claims to be filed by creditors of the Automatic Machine Company, Bridgeport, Conn., which has been seeking reorganization. Any debtor failing to file claims prior to that date will have no voice in any reorganization plan, except on special order, according to the court. Claims should be filed in writing with John Keogh, special master, United States Post Office Building, Bridgeport, Conn.

TIRE SHIPMENTS SHOW 16.7% DROP

Shipments of pneumatic casings during the third quarter of 1937, estimated at 13,590,949 units, show a decrease of 16.7% under shipments made during the second quarter of this year and were 6.6% under shipments made during the third quarter of 1936, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for the third quarter of 1937 is estimated at 12,658,848 units. This is a decrease of 22.9% under the second quarter production and 18.2% under production during the third quarter of 1936.

Pneumatic casings in the hands of manufacturers on September 30, 1937, are estimated at 11,615,262 units, a decrease of 7.3% under the stocks on hand June 30, but 28.9% above the stocks on hand September 30, 1936.

Issue Membership Directory

The Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st Street, New York City, has just issued the fourth edition of its Directory of Association Members. In addition to the usual directory information, this edition contains data about the work member consultants are especially prepared to undertake.

NEW ENGLAND

A. G. Spalding & Bros., Chicopee, Mass., has taken exhibit space in the display section to be sponsored by the Men's Apparel Quality Guild at the New York World's Fair in 1939. Branch managers of the A. J. Reach-Wright & Ditson Company, a sales subsidiary of the Spalding firm, attended a nationwide gathering at the Chicopee plant in January. New lines of merchandise to be marketed this year were studied.

Earnings of the Russell Manufacturing Co., Middletown, Conn., during the fiscal year ended November 30, 1937, amounted to $210,585. This compares with a net loss of $362,340 reported in the previous year. Sales volume for the year, excluding the reorganized division, showed a gain of 36.9%, according to President G. M. Williams.

Stanley N. Blakeslee, 62, president of the Alling Rubber Company of New York City, which operates a chain of rubber stores throughout New England, died on January 21 in Troy, N. Y.

Acme Wire Co., New Haven, Conn., has declared a quarterly dividend of 50 cents, payable February 15 to stock on record on January 31. Payments of $1.00 were made in November and December.

Names in the News

JOHN W. THOMAS, president, Firestone Tire & Rubber Co., Akron, was reappointed chairman of the board of trustees of Akron University on January 27. The appointment runs for six years.

A. G. CAMERON, vice president and general manager, Goodyear Export Co., was given a surprise party at the Portage Country Club on January 26 by his associates, the occasion being his 25th anniversary with the company. He originally joined the company as a salesman in the truck tire division.

ELDEN H. RUCH, for the past 8 years chief chemist of the India Tyre & Rubber Co., Inchinnan, Scotland, recently resigned that post and has returned to the United States. He was connected with several Akron rubber companies before joining the Scottish concern which was recently taken over by the Dunlop Rubber Co., Ltd. MR. RUCH'S future plans have not yet been announced.

W. R. MURPHY, labor superintendent, Firestone Tire & Rubber Co., Akron, has been appointed to a five-year term on the Akron Board of Health. He succeeds B. M. ROBINSON, assistant secretary of Firestone.

H. J. SMITH is no longer acting as export representative for the National Rubber Machinery Company of Akron. MR. SMITH, who maintains offices at 277 Broadway in New York City, stated that the growing activity of the Continental Machinery Company and his own personal connections were responsible for his decision.

WILLIAM C. NEWLON and RAY PERIN, supervisor of V-belts and member of the mechanical goods development department of the Goodyear Tire and Rubber Company, Akron, respectively, sailed for Wolverhampton, England, on January 19 to start the manufacture of rubber belting at the English plant.

R. M. STEVENSON, sales manager, Givaudan-Delawanna, Inc., New York City, has been granted an indefinite leave of absence as of February 1 to devote his full time to the manufacturers' agency business he maintains in Detroit.

TIMOTHY F. DOYLE, comptroller, Firestone Tire and Rubber Co., Akron, was appointed a member of the Sinking Fund Commission of the Akron School District last month, succeeding CHARLES STILLMAN, vice-president, Goodyear Tire and Rubber Co., who recently resigned because of ill health and pressure of business.

OLIVER C. MOLES, assistant export manager, General Tire and Rubber Co., Akron, has accepted the chairmanship of the Foreign Trade Committee of the Akron Chamber of Commerce.

A. E. BENSON has been appointed manager of the product development department of the Fisk Tire Company, Chicopee Falls, Mass., and will be in charge of automobile and bicycle tires and tubes. He succeeds the late STANLEY KRALL.

J. L. MCKNIGHT, assistant secretary, B. F. Goodrich Company, Akron, has been named chairman of the Committee on State Legislation of the Akron Chamber of Commerce. The committee studies pending state legislation particularly with reference to its effect on business.

W. J. JAMES, auditor for the past twenty-five years of the Goodyear Tire and Rubber Co., Akron, retired on January 20. He will inaugurate his retirement with a world cruise and then settle down in Mt. Gilead, Ohio.

GEORGE LANE, assistant superintendent, Premier Rubber Manufacturing Co., Dayton, Ohio, has presented a display board showing the processing of rubber and the ingredients used in its manufacture to the chemical engineering department of the University of Dayton.

W. C. BEHOTEGUY, manager, automobile tire department, and G. E. BRUNNER, assistant sales manager, original equipment tire division, B. F. Goodrich Co., Inc., Akron, both completed 10 years of service with the company last month.

JOHN A. MACMILLAN, chairman of the board, Dayton Rubber Manufacturing Co., Dayton, Ohio, was the principal speaker at the annual Bosses' Night Dinner of the Dayton Junior Chamber of Commerce, held at the Miami Hotel in Dayton on January 12. He discussed the promotion of international good will.

E. D. MARVIN, office manager, Cooper Corporation, Findlay, Ohio, addressed the Findlay branch of the International Accountants Society at a meeting held in Findlay on January 18. He discussed inventories and how they affect accounting.

JOHN LIEFTINCT, export division, Goodyear Tire and Rubber Co., Akron, sailed on January 19 for Java where he will become assistant to the managing director of the Goodyear plant. R. M. CONNELL, also of the export division, sailed on the same date to Brazil where he will act as branch manager for the company in Rio de Janeiro.

KALTER PURCHASES LAMBERTVILLE CO.

An offer of $100,500 made by Max Kalter of New York City, who is president of the Servus Rubber Company, Rock Island, Illinois, for the assets of the Lambertville Rubber Company, Lambertville, N. J., was approved by the referee in bankruptcy last month and confirmation was ordered by Federal Judge Philip Forman at Trenton. Several hearings had been conducted before the final offer was officially approved.

According to the referee's report, Lambertville Rubber is in debt to the extent of $540,000, including mortgages and accounts payable. Although some shoe last materials at the plant have been shipped to Servus Rubber at Rock Island, it is not yet known what disposition will be made of the Lambertville factory. There is a possibility at this writing that it may be reopened by Mr. Kalter in the early future. Lambertville Rubber has been operating under the trusteeship of John T. Crowley.

Kovacs with Seiberling

Frank Kovacs, who left the Seiberling Rubber Company, Akron, in 1930 to become general production manager for the Thiokol Corporation, has returned to Seiberling as manager of the development department, according to H. P. Schrank, vice-president of the company. Mr. Kovacs succeeds E. H. Gibbs who becomes manager of the recently created foreign plant development service department.

English Rubber Reclaimer

Rubber Improvement, Ltd., manufacturers of ground and shredded waste rubber, located at Hythe Road, Willesden, London, England, has begun the production of reclaimed rubber. The new reclaim is described as having a low specific gravity and ash content.

Handling Keasbey Materials

The American Cyanamid and Chemical Corporation, 30 Rockefeller Plaza, New York City, has been appointed exclusive distributors for the magnesia carbonate, oxide and calcined magnesia produced by the Keasbey & Mattison Company, Ambler, Penna.

KARL HEYMANN has joined the Filatex Corporation, Trenton, N. J., as chemist. The company, manufacturers of latex thread, has its sales headquarters in New York City.

BYRON T. MOTTINGER, one-time chief engineer of the rim division of the Firestone Tire and Rubber Co., Akron, has joined the faculty of Youngstown College. He will serve with the Co-Operative Engineering School as coordinator and teacher.

ECONOMIST SEES END OF DECENTRALIZATION

Decentralization of Akron's rubber industry is just about ended, at least for the present, according to John Love, widely known business commentator and economist. Viewing Akron's industrial and business situation, Mr. Love believes that the city's prospects are reassuring despite present lay-offs and shortening of working schedules in the rubber factories.

Mr. Love attributes the start of the decentralization move from Akron, some two years ago, to the fact that Detroit, the home of the automobile manufacturers, was getting tired of sit-down strikes elsewhere and was yet to cope with the same problem on its own grounds and that manufacturers began to realize the danger of having only one source of supply to fulfill contract requirements.

Although Goodrich is still desirous of locating a plant in the south, Mr. Love believes that the chief reason why the migration of tire manufacturers is over is that the industry can no longer flee from labor troubles "because labor's restlessness is continent-wide." Another reason for his belief that the centrifugal movement is over is that a plant built around a single tire size, like the one Firestone built around the Ford size in 1920, can be run efficiently anywhere, but a plant which must make many sizes and many varieties of anything must be much larger and must have a reservoir of skill at its door.

The greatest threat to industry and workers in Akron at present, Mr. Love claims, is the effort in Washington and the south to resettle the American population. He considers this movement as one of the major troubles which will face American manufacturers in 1938.

Carl A. Hallgren

Carl A. Hallgren, chairman of the board, Servus Rubber Company, died at his home in Rock Island, Illinois, on January 14 after a 10-month illness. He was 53 years of age. Mr. Hallgren held various offices with Servus Rubber since joining the company in 1926, and was president for a time before he was made chairman of the board two years ago. He was active in the affairs of Rock Island and was a member of several Masonic branches. He leaves a widow and three children.

Morton K. Maynard

Morton K. Maynard, controller of the General Cable Company, died at his home in White Plains, New York, on January 9, at the age of forty-nine. Mr. Maynard was born in Fair Haven, Vermont, and was graduated from the Fair Haven High School. Shortly thereafter he joined the General Electric Company and was with that company for several years. At the time of his death he had been with General Cable for eight years. He leaves a widow, son and daughter.

Coming Events

Feb. 18. Akron Group, Rubber Division, A.C.S., City Club, Akron.

Feb. 18. Chicago Group, Rubber Division, A.C.S., Hotel Sherman, Chicago.

Mar. 14-16. Annual Convention, N.-A.W.M.D., Hotel Astor, New York.

Mar. 28-29. Spring Meeting, Rubber Division, A.C.S., Book-Cadillac Hotel, Detroit, Mich.

Apr. 8. New York Rubber Group, Building Trades Club, New York.

Apr. 18-21. Spring Meeting, American Chemical Society, Dallas, Texas.

May 6. Boston Group, Rubber Division, A.C.S., Boston.

May 23-25. Rubber Technology Conference, London, England.

June 27 - July 1. Annual Meeting, A.S.T.M., Chalfonte-Haddon Hall, Atlantic City, N. J.

Oct. 10-14. National Safety Congress, Hotel Stevens, Chicago, Ill.

Nov. 4. Boston Group, Rubber Division, A.C.S., Boston.

TRENTON NEWS

Pocono Rubber Company, Trenton, has filed a petition in the United States District Court seeking reorganization under Section 77-b of the Bankruptcy Act. Judge Philip Forman named William H. King, vice-president of the company, trustee of the concern pending a hearing to determine whether the petition shall be granted or a permanent trusteeship established.

In the absence of a will, three sons and a daughter of the late John A. Lambert have been granted letters of administration by the Surrogate Court. All three sons and four daughters will receive equal shares, it is understood. Several changes have been made in the executive set-up of the Acme Rubber Manufacturing Company, of which Mr. Lambert was vice-president and treasurer. Edward T. Comly, secretary, has been made vice-president, and Edward Connelly has been named treasurer. J. Edward Myers, superintendent, continues to occupy that post but has also been appointed secretary of the company.

A battle for membership of Thermoid employees is being waged between the recently-formed Trenton unit of the Independent Rubber Employees Association and the local branch of the United Rubber Workers of America. Fred Schluter, president of the Thermoid Company, recently announced that his company would not renew its agreement with the U.R.W.A.

TIRE INDUSTRY USES 8% OF COTTON CROP

A report recently issued by the Bureau of Agricultural Economics, one of a series prepared by R. J. Cheatham and A. Mason DuPré, Jr., reveals that the tire industry has used about 8% of the total domestic consumption of cotton during the past 16 years. Approximately 40% of all cotton used in the United States finds its way into industrial uses, according to the report, and the manufacture of tires represents one of the largest of such items. During the year 1935-1936 covered by the report, a total of 525,890 bales of American cotton and 19,800 bales of foreign cotton were used in tire manufacture.

As a result of the gradual increase in the size of passenger tires and of the growing proportion of truck and bus tires which contain larger quantities of cotton, the average amount of fabric used per tire has been tending upward in recent years. The cord fabric of a typical passenger car tire, which amounts to approximately 90% of the total fabric by weight, is made from cotton about 1 1/32-inches in length. Other fabric, amounting to approximately 10%, is made from 7/8-inch or 15/16-inch cotton. Longer lengths, 1 3/32-inch and over, are mostly used in the cord fabric of truck and bus tires. Continued increase in cotton consumption in tire manufacture is predicted by the report, but "at a slightly lower rate."

Issue "Neoprene Notebook"

The first issue of "The Neoprene Notebook," new monthly house organ inaugurated by the Rubber Chemicals Division of E. I. de Pont de Nemours & Co., Inc., Wilmington, Delaware, has made its appearance. The purpose of the new publication, which will be distributed without cost to engineers, designers, salesmen, and others, is to present engineering information and laboratory data on neoprene. Thermal conductivity of neoprene and rubber compounds, improvement in quality of the 1938 automobiles, and new uses of neoprene are some of the subjects covered in the first edition.

Goodyear Celebration

The twenty-fifth anniversary of the organization of the mechanical goods division of the Goodyear Tire and Rubber Company was celebrated at Akron early in February. At a dinner held to commemorate the occasion, four veterans of the rubber industry who have been with the division since its inception were guests of honor. Included among the four was W. M. "Pop" Metzler, who has spent 52 years in the rubber industry, starting with Goodrich in 1886. Although Goodyear began the production of mechanical goods at its Bowmanville, Ontario, Canada, plant in 1909, it did not establish its American operations until 1913.

Obituaries

An obituary of Harvey Firestone, Sr., will be found on page 324.

S. S. Miller

S. S. Miller, founder and chairman of the board of the Mohawk Rubber Company and one of the pioneers of the tire industry, died at his home, 697 West Market Street, Akron, on January 29 following a heart attack suffered a few days earlier. He would have been 82 years old on February 7. Mr. Miller first entered the rubber industry as a youth, joining the Goodyear Tire and Rubber Company and rapidly advancing to the post of superintendent. In 1900 he became factory manager of Kelly-Springfield and in that plant designed the first cord tire for automobiles. In 1912 he resigned from Kelly-Springfield to form a company which became the predecessor of the present Mohawk Rubber Company. Two years later he was made president of Mohawk and retained that post until 1930 when he became chairman of the board. He was active in the management of the firm, which is now planning its twenty-fifth anniversary, until his death. As a young man, Mr. Miller took part in the historic G.A.R. convention in San Francisco as a member of "McKinley's Own Band," the 8th Regiment of the Ohio National Guard. Funeral services were held at his home. Burial was in Glendale Cemetery, Akron.

George B. Comey

George B. Comey, associated with the B. F. Goodrich Company for thirty-four years until his retirement in 1912, died at his home in Los Angeles, California, on January 25 following a paralytic stroke. Mr. Comey started with Goodrich in June, 1887, in what is now known as the company's mechanical division, and advanced to the post of general foreman of the molded goods department when he retired. After retiring in 1912, he moved his family to Los Angeles and organized the Globe Ice Cream Company in conjunction with his son. Funeral services and burial were in Los Angeles. He leaves a widow and five children.

Walter S. Ballou

Walter Seymour Ballou, one of the pioneer rubber manufacturers in the United States and a director of several rubber companies, died at his home in Providence, Rhode Island, on January 25, at the age of eighty-eight. For many years, Mr. Ballou was president of the Joseph Banigan Rubber Company. He held directorships in the Dunlop Tire Co., General Rubber Co., Goodyear's India Rubber Glove Mfg. Co., United States Tire Co., and others. He was also a member and director of the executive council of the United States Rubber Company. At one time Mr. Ballou served as president of the Woonsocket Rubber Co. It was recalled at the time he accepted the post, that he had entered the service of that company at the age of fourteen as an office boy. For many years Mr. Ballou was associated with Samuel P. Colt, long head of the United States Rubber Co.

George R. Lamson

George R. Lamson, statistician and librarian for the Firestone Tire and Rubber Company for the past twenty-three years, died at City Hospital in Akron on January 15 as the result of a heart ailment. He was 69 years of age. Coming to Akron twenty-five years ago from New York State, Mr. Lamson joined Firestone two years later. Under his supervision, Firestone accumulated a library of more than 13,000 books and periodicals, as well as charts, pamphlets and other literature. Six assistants worked under his guidance. He was a member of the Firestone Twenty Year Club. Funeral services were held at his home, 15 South Balch Street, Akron, on January 17. He leaves a widow and a sister.

Alton T. Terrell

Alton T. Terrell, president, Ansonia O. & C. Manufacturing Co., Ansonia, Conn., manufacturers of elastic webbing, died suddenly in New York City on January 22 at the age of sixty-five. Mr. Terrell entered the employ of the Ansonia concern as a boy and rose through the ranks to become president. He was also treasurer of the Chatham Manufacturing Co., manufacturers of rubber thread; a director of the Ansonia Water Co.; and a director of the Ansonia National Bank. Mr. Terrell was a 32nd degree Mason. He leaves a widow and two sons.

Frank Pegler

Frank Pegler, chairman and managing director of the Northern Rubber Co., Ltd., Retford, Notts, England, one of the larger rubber manufacturers in England, died at Nice, France, on January 8 at the age of eighty-two. With his father, Alfred Pegler, and his brother, Stephen Francis, Mr. Pegler founded the Northern Rubber Company in 1871. In addition, Mr. Pegler held directorships in several British companies and was also a vice-president of the Research Association of British Rubber Manufacturers.

Sir Thomas Stanton

Sir Thomas Stanton, adviser to the British Government on tropical diseases and for many years bacteriologist at the Institute for Medical Research at Kuala Lumpur, F.M.S., died on January 25 at his home in London, England. He was 62 years of age. Sir Thomas carried out notable researches in bacteriology and entomology and was well known to the rubber cultivating industry for his work in connection with rubber plant diseases. He also contributed valuable aid to the elimination of beri-beri in the tropics. Sir Thomas was the author of several works on tropical diseases and in 1933 received an honorary degree from the University of Toronto. He was knighted in 1934. Lady Stanton survives.

Charles F. Snyder

Charles F. Snyder, director of public safety for the City of Massillon, Ohio, and formerly associated with the Goodyear Tire and Rubber Company, died from an apoplectic stroke on January 24 at City Hospital in Massillon. He was born and received his education in Massillon. About 15 years ago, Mr. Snyder was sent to South America by Goodyear where he supervised the construction of the company's factory at Buenos Aires. He managed the plant for several years after it started operations. Returning to the United States he entered the paper, automobile and sand and gravel business, respectively, and entered politics in 1936 when he was appointed to the safety post he held at the time of his death. He leaves a widow.

Paul R. Mahony

Paul R. Mahoney, who served as executive vice-president of the International B. F. Goodrich Corporation, now known as the International Division of the B. F. Goodrich Company, from 1928 to 1931 died on January 6 in Bombay, India, according to advices received at the Akron offices of Goodrich. Death was attributed to typhoid fever. Mr. Mahony joined Goodrich after long service in the export divisions of the Remington Typewriter Co. and the Wahl Co. He was associated with the Wahl concern at the time of his death. He leaves a widow.

R. P. D. Graham

R. P. D. Graham, export and traffic manager of the Goodyear Tire and Rubber Company of Canada, Ltd., died on January 18 at the age of 63 following a period of failing health. Mr. Graham, a native of Canada, joined Goodyear in 1911 shortly after the company took over the plant at Bowmanville. He watched the plant expand to the largest in the Dominion. Starting as an assistant to the sales manager in the tire division, Mr. Graham organized the export department in 1916 and was with that division for many years.

New Rubber Goods

Hollywood Household Mittens

Padded rubber mittens, designed to lessen the task of the housewife, have been developed by the Hollywood Rubber Products Co., 7046 Hawthorne Ave-

nue, Hollywood, Calif. Known as "Hollywood Household Mittens," these mittens have rubber scouring pads vulcanized to the points of greatest wear—the ends of the fingers and the thumb. Dipped into cleaning powder, these pads are said to be far more effective in cleaning dirty dishes than are dishcloths. The mittens may also be used for cleaning bath tubs and toilet bowls, as well as for cleaning vegetables, washing windows, garden work, etc. Due to their design, they slip on and off the hands easily and permit comfortable freedom for the fingers.

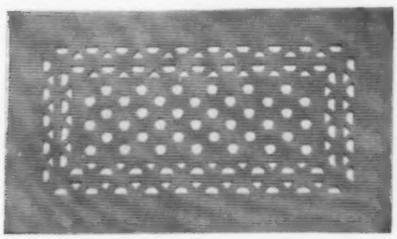
Rubber Kicking Toe

A. G. Spalding & Co., Chicopee, Mass., and New York City, has developed an all-rubber kicking toe for football use. The toe has a ribbed surface on its blunt front and is reinforced by strips of fabric on the sides and on the upper surface of the front interior. It is cut out on the bottom so that it fits over

cleated football shoes and is also provided with a flexible strap at the back to make it adjustable for various size shoes. The new device, which is reported to aid considerably in gaining height and distance on kicks, is called the Cushman Kicking Toe.

Quaker Perforated Mats

In addition to its regular line of rubber mats and matting, the Quaker City Rubber Company recently added a line of perforated mats in various colors. The mats are so constructed that the corrugated surfaces wipe off mud, snow, slush or grit, which collect in the perforations and are removed from time to time. The perforations, die-cut by



hand, make the mats particularly suitable for use around lunch counters, soda fountains, on marine craft, and for other applications. The new mats, available in several popular sizes and all 3/16-inches in thickness, are said to be non-blooming.

Snow White Stamp Set

Tying in with the publicity and popularity surrounding Walt Disney's full-length movie production of Snow White and the Seven Dwarfs, the Fulton Specialty Co., Elizabeth, N. J., has announced an art stamp picture set with

the same name. The rubber stamps carry replicas of the principal characters in the film and story. The sets, in three different size and price ranges, contain rubber stamps, a stamp pad, crayons and a paper pad.

Royalty Garment Protectors

A line of garment protectors under the trade-name of "Royalty" has been introduced by the Royalty Texture Company, 32 Boulevard of the Allies, Pittsburgh, Penna. The garment protectors, available in various sizes to accommo-

date one or more garments, are made of Pliofilm, the rubber derivative transparent material developed by Goodyear. Some of the protectors incorporate a trapeze for trains of evening gowns to avoid wrinkling, as well as special built-in pockets (to hold moth preventatives) for the storage of furs and fur coats. The Pliofilm garment protectors are said to be surprisingly sheer, yet extremely durable, and to offer more than twice the tear resistance than do cellulose protectors of the same type. Cleaning them is comparatively simple, a clean, damp cloth being all that is necessary to restore the original sparkle. Other Pliofilm products featured by the Royalty Texture Company include blanket and linen protective envelopes, lingerie and boudoir set containers, ladies and gentlemen's vests, booties for ladies and children for rainy weather, sleeve protectors and additional novelties.

Rubber Number Plates

Number plates for use as automobile license plates and other applications have been developed by Sol Number Plates and Signs, Ltd., 406 Montrose Avenue, Trading Estate, Slough, Bucks, England. The plates are made of solid molded rubber, strengthened and reinforced to give rigidity but with sufficient resilience to prevent bending or buckling. The top surface of the plate is coated with rubber protected by an oil-silk covering. The letters and numerals are white, similarly coated, and protected on the front surface. The digits are easily attached to the plates when desired.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, FEBRUARY 8, 1938

Crude Rubber

PENDING the quota decision of the International Rubber Regulation Committee the price of spot rubber on the Exchange moved upward slowly but steadily in the second and third weeks of January. On January 25, the Committee announced a 10% cut in permissible shipments from signatory countries for the second quarter of the year, bringing it down to 60% of basic quotas. This announcement, as expected, resulted in a sharp increase in the price, *i.e.*, from 14.80 on January 24 to 15.19 the following day. Due to complete lack of factory interests, the price dipped on January 26 to 14.74, wiping out the gain completely, and has since continued to decline with only a few upward spurts halting the falling price. The publication of annual 1937 figures for domestic consumption of crude rubber which compared unfavorably with the preceding year, and the year-end report of the tire situation which showed inventories larger than had been anticipated, both contributed to the declining market. In the past day or two there has been some interest expressed by smaller factories and it is believed that the larger manufacturers will shortly enter the market thus bolstering up the price. Quotations in the outside market, Exchange, London, and Singapore, follow:

As of February 8

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.14¼
February-March	—	@	.14⅜
April-June	—	@	.14⅜
No. 2	—	@	.13⅞
No. 3	—	@	.13⅜
No. 4	—	@	.13⅜
Thin Latex Crepe	—	@	.14¼
Thick Latex Crepe	—	@	.14⅝
Brown Crepe, No. 1	—	@	.13½
Brown Crepe, No. 2	—	@	.13⅜
Amber Crepe, No. 2	—	@	.13½
Amber Crepe, No. 3	—	@	.13⅜
Amber Crepe, No. 4	—	@	.12⅞
Brown Crepe, Rolled	—	@	.10⅞

Latex—

Normal, per lb., carload lots	.17⅜	@	.17⅝

Paras—

Up-River, fine	—	@	.13
Acre Bolivian, fine	—	@	.13¼

Balata—

Surinam sheet	.35	@	.36

LONDON MARKET

Standard Smoked Sheets—Buyers—February 8

April-June	—	@	7 1/16d
July-September	—	@	7 1/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—February 8

April-June	—	@	6 13/32d
July-September	—	@	6 13/32d

Reclaimed Rubber

Reclaimers report business dull and although they do not expect much revival during the current month they look forward to a pick-up in March. Annual reclaim figures for 1937 showed an increase in consumption over the preceding year. Slight changes have been made in the price of washed shoe and floating tubes since our last report. Current quotations follow:

Shoe

Unwashed	lb.	.07	@	.07¼
Washed	lb.	.10½	@	.10¾

Tube

No. 1 (Floating)	lb.	.14	@	.14½
No. 2 (Compounded)	lb.	.09	@	.09½
Red tube	lb.	.09	@	.09½

Tires

Black (acid process)	lb.	.07¼	@	.07½
Black, selected tires	lb.	.06¼	@	.06½
Dark Gray	lb.	.09¾	@	.10
White	lb.	.13	@	.13½
Truck, Heavy Gravity	lb.	.06	@	.06½
Truck, Light Gravity	lb.	.07½	@	.08

Miscellaneous

Mechanical blends	lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Scrap rubber dealers report a slight improvement in recent weeks with growing interest from the smaller reclaimers. This movement is expected to continue. Prices have dropped slightly on practically all grades of scrap since our last report with a drop of $3.50 a ton on untrimmed arctics. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	19.00	@	20.00
Mixed auto	ton	13.00	@	13.50
Beadless tires	ton	16.50	@	17.00
Clean solid truck tires	ton	25.00	@	27.50
Boots and shoes	ton	17.50	@	19.00
Arctics, untrimmed	ton	12.50	@	15.00
Inner tubes, No. 1	lb.	.09	@	.10
Inner tubes, No. 2	lb.	.04¼	@	.04½
Inner tubes, Red	lb.	.04	@	.04¼

Cotton

Based on fears of early enactment of the farm bill with its price strengthening amendments now pending before Congress, the cotton market has moved upward sharply in the past few days ending in a new high since our last report of 8.74 today (February 8). Low for the period was 8.43 on January 29. The probability that distribution of cotton products has far exceeded production for several months has also contributed to the upward movement. Were it not for the ever-present possibility of an inflation scare, the price would undoubtedly move quickly into higher channels. The farm bill is occupying the full attention of the trade at present. If passed in its present form with only minor adjustments, it would include an amendment providing for C.C.C. acquisition of loan cotton and payment of advances on subsidies. Although many cotton factors are strongly protesting passage of the bill in its current form, the market as a whole is anticipating its early passage. In some quarters the hope has been expressed that passage of the bill may finally result in striking an approximate balance between supply and demand. This would help the price situation considerably. Quotations for middling uplands on the Exchange follow:

	Jan. 11	February 8		
	Close	High	Low	Close
March	8.62	8.68	8.44	8.62
May	8.68	8.78	8.54	8.69
June	...	8.88	8.62	8.78

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.29	@	.29¼
Peeler, carded, 23/4/3	lb.	.30	@	.30¼
Peeler, carded, 15/3/3	lb.	.27	@	.27¼
Peeler, carded, 13/3/3	lb.	.26	@	.26¼
Egyptian, carded, 23/5/3	lb.	.43	@	.43¼
Egyptian, combed, 23/5/3	lb.	.48	@	.48¼
CHAFERS				
Carder, American, 1⅛"	lb.	.29	@	.29½
Carded, American, 1"	lb.	.21	@	.25

Sheetings

48x40	36	in.	5.50	lb.	—	@ .03¾
40x40	36	in.	6.15	lb.	—	@ .03½
40x36	36	in.	6.50	lb.	—	@ .03¼
48x48	40	in.	2.50	lb.	—	@ .07⅜
48x48	40	in.	2.85	lb.	—	@ .06⅝
56x60	40	in.	3.60	lb.	—	@ .06⅛
48x44	40	in.	3.75	lb.	—	@ .05¼
44x40	40	in.	4.25	lb.	—	@ .05

Ducks

Enameling (single filling)	lb.	.20	@	.23
Belting and Hose	lb.	.25	@	—
Single filling, A grade	lb.	.09¾	@	.12¾
Double filling	lb.	.11¼	@	.13

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM JANUARY 12 TO FEBRUARY 8

Date	Spot	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Sales
Jan. 12	14.64	14.60	14.70	14.80	14.86	14.93	14.99	15.05	15.10	15.15	15.20	15.25	15.30	——	158
13	14.66	14.62	14.72	14.82	14.88	14.95	15.02	15.10	15.15	15.20	15.25	15.30	15.35	——	96
14	14.57	14.53	14.63	14.73	14.80	14.88	14.92	14.99	15.02	15.06	15.11	15.16	15.21	——	102
15	14.74	14.70	14.80	14.90	14.97	15.04	15.08	15.12	15.17	15.23	15.28	15.33	15.38	——	58
16															
17	14.69	14.65	14.75	14.85	14.91	14.97	15.02	15.07	15.12	15.17	15.22	15.27	15.32	——	23
18	14.67	14.63	14.73	14.83	14.90	14.97	15.03	15.10	15.15	15.21	15.26	15.31	15.36	——	147
19	14.70	14.65	14.75	14.85	14.92	15.00	15.04	15.09	15.15	15.21	15.28	15.35	15.42	——	105
20	14.93	14.88	14.98	15.08	15.15	15.22	15.28	15.35	15.40	15.45	15.49	15.53	15.57	——	219
21	14.92	14.87	14.95	15.04	15.13	15.22	15.27	15.32	15.37	15.43	15.47	15.51	15.55	——	323
22	14.85	14.81	14.89	14.98	15.07	15.16	15.21	15.27	15.31	15.36	15.41	15.46	15.51	——	41
23															
24	14.80	14.76	14.84	14.92	14.99	15.06	15.11	15.19	15.25	15.32	15.37	15.42	15.47	——	531
25	15.19	15.14	15.22	15.30	15.36	15.40	15.47	15.53	15.58	15.63	15.69	15.74	15.79	——	383
26	14.74	14.69	14.77	14.85	14.94	15.04	15.10	15.16	15.22	15.28	15.33	15.38	15.43	——	314
27	14.75	——	14.77	14.84	14.91	14.99	15.04	15.10	15.15	15.20	15.25	15.30	15.35	——	224
28	14.68	——	14.65	14.73	14.80	14.86	14.93	14.99	15.04	15.10	15.15	15.20	15.25	——	174
29	14.56	——	14.49	14.57	14.63	14.70	14.76	14.82	14.88	14.95	15.00	15.05	15.10	——	185
30															
31	14.65	——	14.65	14.73	14.81	14.88	14.94	15.00	15.05	15.10	15.14	15.18	15.22	——	180
Feb. 1	14.53	——	14.49	14.57	14.64	14.70	14.75	14.80	14.87	14.94	14.99	15.04	15.09	15.14	83
2	14.46	——	14.44	14.52	14.58	14.65	14.71	14.77	14.83	14.90	14.95	15.00	15.05	15.10	129
3	14.33	——	14.29	14.37	14.46	14.55	14.60	14.65	14.71	14.78	14.83	14.88	14.93	14.98	151
4	14.22	——	14.18	14.26	14.35	14.44	14.49	14.55	14.59	14.64	14.69	14.74	14.79	14.84	207
5	14.38	——	14.34	14.42	14.51	14.60	14.65	14.71	14.76	14.81	14.86	14.91	14.97	15.02	106
6															
7	14.28	——	14.26	14.34	14.42	14.51	14.58	14.65	14.69	14.74	14.79	14.84	14.89	14.94	116
8	14.36	——	14.32	14.40	14.48	14.56	14.60	14.65	14.72	14.80	14.85	14.90	14.95	15.00	84

Rubber CHEMICAL Markets

NEW YORK, FEBRUARY 9, 1938 [All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.26	@	—
A-5-10	lb.	.35	@	.40
A-11	lb.	.52	@	.65
A-19	lb.	.52	@	.65
A-32	lb.	.70	@	.80
A-77	lb.	.42	@	.55
A-100	lb.	.42	@	.55
A-433	lb.	.45	@	.55
Aldehyde ammonia, crystals	lb	.65	@	.70
Altax	lb.	—	@	—
Captax	lb.			
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.46
Diphenylguanidine	lb.	.35	@	.36
El-Sixty	lb.	.57	@	—
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.37½	@	.42
Guantal	lb.	.45	@	—
Heptene	lb.	.40	@	—
Hexamethylenetetramine	lb.	.36	@	—
Lead Oleate, No. 999	lb.	.13	@	—
Witco		.15	@	—
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	—
Phenex	lb.	.50	@	.55
Pip-Pip	lb.	2.50	@	—
Pipsolene	lb.	1.55	@	1.85
R & H 40	lb.	.40	@	.41
R & H 50	lb.	.40	@	.41
R-2	lb.	1.40	@	1.80
R-23	lb.	.40	@	—
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.			
No. 2	lb.			
Thiocarbanilid, drums	lb.	.26	@	—
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.60
Tuads	lb.			
Ureka	lb.	.60	@	.75
Ureka Blend B	lb.	.60	@	.75
Ureka C	lb.	.56	@	.65
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Z-88-P	lb.	.51	@	—
Zimate	lb.			
Inorganic				
Litharge, domestic	lb.	.06½	@	.07¾
Magnesia, calcined, heavy	lb.	.04	@	—

COLORS

Blacks (See Compounding Materials)				
Blues				
Prussian	lb.	.36	@	.37
Ultramarine	lb.	.15	@	—
Browns				
Mapico	lb.	.13	@	—
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome	lb.	.21	@	—
Chromium Oxide, bbl.	lb.	.21	@	—
Guignet's Green	lb.	.70	@	—
Reds				
Antimony crimson, 15/17	lb.	.48	@	—
sulfur, free	lb.	.48	@	.60
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼	@	—
Whites				
Cryptone, No. 19	lb.	.05⅞	@	.06½
Cryptone CB, No. 21	lb.	.05⅞	@	.06½
Cryptone, ZS-20	lb.	.09	@	.09¼
Cryptone, ZS-86	lb.	.09	@	.09½
Lithopone				
Albalith, black label—11	lb.	.04¾	@	.04¾
Azolith	lb.	.04⅜	@	.04⅜
Rayox	lb.			
Titanox A	lb.	.16	@	.16¼
Titanox B	lb.	.05⅞	@	.06½
Titanox C	lb.	.05⅞	@	.06½
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06¼	@	.06½
Anaconda, lead free	lb.	.06¼	@	.06½
Horsehead Lead Free Brand:				
Special—3	lb.	.06¼	@	.06½
XX Red—4	lb.	.06¼	@	.06½
XX Red—72	lb.	.06¼	@	.06½
XX Red—78	lb.	.06¼	@	.06½
XX Red—103	lb.	.06½	@	.06¾
Kadox, black label—15	lb.	.06½	@	.06¾
Blue label—16	lb.	.06½	@	.06¾
Red label—17	lb.	.06½	@	.06¾
St. Joe, black label	lb.	.06¼	@	.06½
green label	lb.	.06¼	@	.06½
red label	lb.	.06¼	@	.06½
U S. P.—7, bbls.	lb.	.09	@	.09¼
Zinc Oxide—French Process				
Florence White seal—7 bbls.	lb.	.08½	@	.08¾
Green seal—8	lb.	.08	@	.08¼
Red seal—9	lb.	.07½	@	.07¾
Yellows				
Cadmolith	lb.	.61	@	—
Chrome	lb.	.14½	@	.15½
Mapico	lb.	.09½	@	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.027	@	.036
Bone, powdered	lb.	.025	@	.03
Carbon, compressed	lb.	.0435	@	.0775
uncompressed	lb.	.0435	@	.0775
"Certified"	lb.	—	@	—
Spherons	lb.	—	@	—
"Disperso"	lb.	.027	@	.036
Drop, bbls.	lb.	.05½	@	.06
"Excello," compressed	lb.	.0435	@	.0775
"Fumonex"	lb.	.03	@	.07
"Gastex"	lb	.03	@	.07
Lampblack	lb.	.07	@	.12
"Micronex"	lb.	.027	@	.036
"Supreme"	lb.	.0435	@	.0775
Thermatomic—"P 33"	lb.	—	@	—
"Thermax"	lb.	—	@	—
United "Dixie" & "Kosmos"	lb.	.027	@	.036

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	13.00	@	15.00
Barium carbonate (98-100%)	ton	52.50	@	57.50
Barium Dust	lb.	.05	@	.06
Barytes	ton	23.65	@	31.15
Basofor	lb.	.04½	@	—
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	60.00	@	65.00
Calcene	ton	37.50	@	45.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra li	ton	45.40	@	60.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	9.50	@	21.00
Congaree	ton	9.50	@	—
Crown (f.o.b. plant)	ton	9.50	@	—
Dixie	ton			
Dixie, Jr.	ton			
McNamee	ton			
Par	ton			
Tensulite		15.00	@	—
Witco	ton	9.50	@	—
Cotton Flock	lb.	.11	@	.15
Glues, extra white	lb.	.28	@	.30
medium white	lb.	.14	@	19
Kalite No. 1	ton	—	@	—
Kalite No. 3	ton	—	@	—
"Lime Crest" Industrial Filler No. 100	lb.	—	@	—
Magnesium carbonate	lb.	.07½	@	—
Mica	ton	35.00	@	44.00
Pyrax A	ton	—	@	—
Rottenstone (powdered)	lb.	.02½	@	.05
Soapstone, powdered	ton	16.00	@	22.00
Starch, powdered	cwt.	2.90	@	4.10
Talc, domestic	ton	17.00	@	20.00
Whiting, commercial	ton	17.00	@	18.00
Columbia Filler	ton	9.00	@	14.00
English Cliffstone	ton	33.00	@	43.00
Witco	ton	7.00	@	—
Wood Flour	ton	20.00	@	25.00
Zinc Carbonate	lb.	—	@	.10¾
Zinc Stearate	lb.	—	@	.27

MINERAL RUBBER

Black Diamond	ton	27.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton			
Parmr, solid	ton	25.00	@	—
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

MISCELLANEOUS

Aromatics—Roto	lb			
Curodex 19	lb.	2.75	@	—
Curodex 188	lb.	3.50	@	—
Curodex 198	lb.	4.50	@	—
Para-Dors No. 5145	lb.	2.00	@	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.40	@	—
Santomerse (dispensing, wetting, penetrating and stabilizing agent)	lb.	.13	@	—
Sunproof	lb.	.35	@	.37½
Sponge Paste	lb.	—	@	.80
Tackol (tackifier)	lb.	.115	@	—
Tonox	lb.	.50	@	.60

SOFTENERS

Acids				
Acetic, 28%, bbls.	100 lb.	2.53	@	2.78
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Acids, Fatty				
Laurex	lb.	.15	@	.16
Stearex Beads	lb.	.10¾	@	.11¼
Stearic, double pressed	lb.	.12½	@	.13½
Stearite	lb.	.10½	@	.11¾
Alkalies				
Caustic Soda, 76%	cwt.	3.15	@	3.80
Soda Ash, 58%, C.L.	cwt.	—	@	2.35
Oils				
Cycline Oil	gal.	.20	@	—
Degras, bbls.	lb.	.07¾	@	.08
Fluxrite	lb.	.05½	@	.06½
Palm Niger	lb.	.05½	@	.06½
Para-Flux	gal.	.17	@	—
Petrolatum, light	lb.	.03⅛	@	.03⅜
Pigmentaroil, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
Pine, steam distilled	gal.	.64	@	.69
dest. dist., drums	gal.	.49	@	.50
Rosin Oil, cmpd.	gal.	.40	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rubtack	lb.	.08	@	.10
Needime, c.l.	lb.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.07	@	—
Witco Softener No. 20	gal.	.20	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.05½	@	.06½
coal tar	ton	19.00	@	22.00
hardwood	ton	16.00	@	22.50
pine, 200 lb. gr. wt.	bbl.	6.00	@	6.50
Pigmentar, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
R. S. I. Resin	lb.	—	@	—
Retort Pine Tar, drums	ton	20.00	@	26.00
Solvents				
Acetone, pure	lb.	—	@	.06¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33	@	.39
Benzene, 90%	gal.	.18	@	.23
Beta-Trichlorethane	gal.	—	@	.20
Bondogen	lb.		@	
Carbon, bisulfide	lb.	.05¼	@	.08
Carbon tetrachloride	lb.	.05¾	@	.08¼
Dichlorethylene	lb.	—	@	.25
Dipentene, cml., drums	gal.	.41	@	.50
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Ethylene dichloride	lb.	.05½	@	.06½
Plastogen	lb.			
Reogen	lb.			
Rub-Sol (f.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.09½
Turpentine, spirits	gal.	.43	@	.47
dest. dist., drums	gal.	.33	@	.41
Waxes				
Beeswax, white	lb.	.39	@	.45
Carnauba, yellow	lb.	.46	@	.47½
Ceresin, white, dom.	lb.	.08	@	.11
Montan, crude	lb.	.10¾	@	.11¾
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.02¾	@	—
White crude scale 124/126	lb.	.02¾	@	.03
Refined, 122/127	lb.	.04½	@	—

ANTI-OXIDANTS

AgeRite, Gel	lb.			
HP	lb.			
Powder	lb.			
Resin	lb.			
White	lb.			
Albasan	lb.	.70	@	.75
Antox	lb.			
B-L-E	lb.	.57	@	.60
Flectol H	lb.	.54	@	—
Flectol White	lb.	1.00	@	—
Flectol B	lb.	.54	@	—
Neozone	lb.			
Oxynone	lb.	.68	@	—
Perflectol	lb.	.67	@	.75
Retardex	lb.	.35	@	.40
Santoflex A	lb.	—	@	—
Santoflex B	lb.	.54	@	—
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.60

MOLD LUBRICANTS

Aresklene	lb.	—	@	—
Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Lubrex	lb.	.25	@	.30
Mold Paste	lb.	.18	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rusco, f.o.b. Nitro	lb.	.25	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.19	@	—
Black	lb.	.07	@	.13½
White	lb.	.085	@	.15¼
Brown	lb.	.085	@	.14
Neophax	lb.	.11	@	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.04½	@	—
Sulfur flour.				
Refined, 100% pure (bags)	cwt.	2.55	@	3.65
Commercial (bags)	cwt.	1.60	@	2.35
Telloy	lb.			
Vandex	lb			

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,362	185,060,304	26.71	8,772	5,672,319	28.87	300,590
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1936:							
May*	35,578	11,460,157	14.38	1,589	580,021	16.30	33,989
June	36,376	12,073,632	14.82	2,469	904,669	16.35	33,907
July	38,178	12,763,200	14.92	1,383	510,075	16.47	36,795
Aug.	40,027	13,364,916	14.91	840	307,114	16.32	39,187
Sept.*	48,368	16,691,919	15.41	656	244,554	16.64	47,712
Oct.	39,573	13,627,465	15.37	778	268,645	15.42	38,795
Nov.*	36,798	12,790,306	15.52	675	241,982	15.99	36,123
Dec.	49,312	17,555,705	15.89	677	267,745	17.65	48,635
1937:							
Jan.	42,002	15,408,242	16.38	844	372,053	19.69	41,158
Feb.	42,743	16,470,867	17.20	523	236,853	20.21	42,220
Mar.	38,682	16,030,267	18.50	1,146	522,931	20.37	37,536
Apr	41,275	17,859,223	19.31	1,050	415,484	17.66	40,225
May	46,902	22,163,440	21.10	528	270,499	21.08	46,374
June	47,073	22,559,545	21.39	807	390,542	21.60	46,266
July	41,493	19,010,273	20.45	767	300,301	17.48	40,726
Aug.	48,020	20,595,314	19.15	670	265,298	17.69	47,350
Sept.	55,123	22,119,248	17.91	668	280,741	18.76	54,455
Oct.	51,171	20,250,893	17.67	450	172,466	17.13	50,721
Nov.	51,958	19,905,523	17.01	159	66,501	18.72	51,799
Dec.	68,006	24,934,206	16.37	290	91,764	14.14	67,716

* Revised.

Note: Annual figures for 1922-1936 revised on basis of information received on February 8, 1937. Figures for 1922 and 1923 include latex; guayule is included only in 1922.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,310
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1936:								
Dec.	134	36,972	14	7,247	538	109,208	2,070	735,156
1937:								
Jan.	160	44,166	10	4,348	247	56,056	1,337	535,546
Feb.	206	56,807	14	5,838	242	61,741	1,973	775,202
Mar.	136	37,453	29	13,949	898	187,413	2,216	968,053
Apr.	190	52,361	3	1,457	617	135,412	1,633	724,757
May	182	50,093	75	33,881	642	145,618	1,995	941,235
June	147	39,941	91	41,481	488	135,468	2,561	1,253,370
July	371	106,360	22	9,363	533	158,998	1,921	924,127
Aug.	335	95,893	16	5,876	363	107,611	1,801	838,778
Sept.	329	90,822	5	2,196	701	214,511	1,901	839,159
Oct.	247	68,178	29	12,090	460	149,516	1,958	844,205
Nov.	251	69,452	29	9,374	593	194,889	2,085	875,074
Dec.	140	34,347	31	11,491	1,325	470,553	1,804	694,164

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

(All Quantities in Long Tons)

	Figures on Monthly Basis: 1930	1931	1932	1933	1934	1935	1936*	1937
Jan.	36,194	28,557	29,648	22,645*	39,190*	46,636*	48,631	50,818*
Feb.	33,302	28,797	31,821	21,392*	40,515*	42,720*	36,841	51,887*
Mar.	35,540	32,788	29,505	17,483*	47,003*	42,153*	42,813	54,064*
Apr.	39,686	33,321	27,518	25,928	44,853*	44,247*	52,031	51,797
May	39,386	37,817	30,957	44,074	42,918*	41,101*	50,612	51,733
June	34,195	37,916	41,475	50,743*	40,147*	36,156*	52,772	51,798
July	29,508	31,397	29,976	49,614*	32,553*	35,917*	48,250	43,650
Aug.	30,850	27,586	23,721	44,428*	33,216*	38,775*	46,777	41,456
Sept.	25,515	23,638	23,847	35,281*	30,258*	37,086*	46,449	43,893
Oct.	27,516	22,277	22,286	31,543*	31,253*	41,969*	49,637	38,707
Nov.	23,691	22,943	23,231	28,831*	34,748*	42,310*	50,433	33,984
Dec.	21,687	21,409	18,015	28,757*	36,569*	42,474*	49,754	29,160
Tot.	375,980	348,986	332,000	400,719*	453,223*	491,544*	575,000	542,947

* Revised.

Note: Figures for 1936 were revised on May 15, 1937, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,589	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,006	1935	122,948	113,078*	23.0*	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	141,486*	24.6*	19,000*
1932	75,608	77,504	23.4	16,354	1937	178,776	157,990	29.1	26,260

Figures on Monthly Basis

	Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]		Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]
1936*:									
Jan.	11,665	10,922	22.5	17,171	July	12,330	12,856	26.6	16,207
Feb.	10,188	8,014	21.8	18,890	Aug.	12,856	11,959	25.6	16,487
Mar.	10,712	9,539	22.3	19,472	Sept.	12,959	12,153	26.2	16,711
Apr.	11,382	11,241	21.6	19,024	Oct.	14,737	13,715	27.6	17,141
May	11,512	11,311	22.3	18,590	Nov.	14,357	13,087	25.9	17,900
June	11,935	12,563	23.8	17,366	Dec.	15,938	14,126	28.4	19,000
1937:									
Jan.*	15,129	14,450	28.4	18,822	July	16,241*	12,128*	27.8*	17,682*
Feb.*	15,192	14,578	28.1	18,490	Aug.	16,543*	13,227*	31.9*	19,706*
Mar.*	14,462	15,601	28.9	16,450	Sept.	16,410	13,681	37.4	21,597
Apr.	13,884	15,607	30.1	14,046	Oct.	15,849	12,234	31.6	23,572
May	15,793	14,693	28.4	14,647	Nov.	12,406	9,703	28.6	24,620
June	16,052	14,414	27.8	14,535	Dec.	10,815	7,674	26.3	26,260

[a] Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)

(In Thousands of Barrels of 42 Gallons)

	1935*	1936*	1937		1935*	1936*	1937
January	28,147	32,344	33,696	August	43,097	46,061	49,597
February	26,580	27,178	32,000	September	37,976	44,366	47,245
March	32,272	35,864	40,561	October	41,566	44,163	45,361
April	36,363	38,864	43,409	November	35,991	39,954	
May	39,381	42,010	45,484	December	33,872	39,590	
June	38,086	44,522	48,580				
July	41,479	46,865	50,929	Total	434,810	481,606	

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,098
1929	24,141,502	1933	8,713,962	1937	22,257,982

1937:		1937:		1937:	
January ...	2,123,723	May	2,189,502	September .	1,470,472
February ..	2,022,258	June	2,141,810	October ...	1,890,082
March	2,166,218	July	1,702,105	November ..	1,818,169
April	2,269,680	August	1,342,945	December ..	1,121,018

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1935 December	——	13 7/8	12 3/4	12 7/8	13	13 1/8	13 3/8	——	13	12 1/8	13	13	13	13 3/4	——	13 7/8	13 7/8	13 1/2	13 3/4	13 3/4	13 3/4	——	13 3/4	13 3/4	——	13 7/8	13 3/8	——	13 3/4	13 7/8	13 3/4
1936																																
January	——	13 1/2	13 3/8	13 3/8	——	13 3/4	13 1/8	13 1/8	13 3/8	14	14 1/8	——	——	14 1/8	14 1/8	14 7/8	14 7/8	14 1/8	14 3/8	14 3/4	14 3/4	14 3/8	14 1/2	14 1/8	14 1/8	15	15	——	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2
February	——	15 7/8	15 3/8	15 3/8	15 3/4	15 7/8	15 1/8	15 1/8	15 1/8	15 3/8	15 1/8	15 1/8	15 1/8	15 1/8	15 3/4	15 3/4	15 3/4	15 3/8	15 7/8	15 7/8	15 7/8	15 3/4	15 3/4	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
March	——	15 3/4	15 3/8	15 3/8	15 3/4	15 7/8	15 1/8	15 1/8	15 1/8	15 3/8	15 1/8	15 1/8	15 1/8	15 1/8	15 3/4	15 3/4	15 3/4	15 3/8	15 7/8	15 7/8	15 7/8	15 3/4	15 3/4	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
April	——	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
May	——	15 1/8	15 1/8	15 3/4	15 3/4	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
June	——	15 3/8	15 3/8	15 3/4	15 3/4	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
July	——	16 1/8	16 1/8	16 3/4	16 3/4	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
Aug.	——	——	16 7/8	16 7/8	16 3/4	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
Sept.	——	——	16 7/8	16 7/8	16 3/4	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
Oct.	——	——	16 7/8	16 7/8	16 3/4	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
Nov.	——	——	16 7/8	17 1/8	16 3/4	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
Dec.	——	18 1/2	18 5/8	19	19 3/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8
1937																																
Jan.	——	——	21	21	20 3/4	21 1/8	21 1/8	21 1/8	22 1/8	21 1/8	22 1/8	22 1/8	22	21 1/8	21 1/8	21 1/8	21 1/8	21 7/8	21 7/8	21 7/8	21 7/8	20 3/8	20 3/8	20 3/8	20 3/8	21 3/4	21 3/4	21 3/4	21 3/8	21 3/8	21 3/8	——	21 3/8
Feb.	——	21	21 1/8	21 1/8	21 1/8	21 1/8	——	——	21 1/2	21 1/8	21 1/8	21 1/8	——	——	21 1/8	21 1/8	21 1/8	——	20 1/8	20 1/8	20 1/8	——	23 3/4	24 3/4	23	——	21 1/8	21 1/8	21 1/8	21 1/8	——	21 1/8
Mar.	——	21 1/8	21 1/8	21 1/8	22 3/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8	21 1/8
April	——	26 3/4	26 3/4	21 3/8	23 3/4	24 1/8	24 1/8	24 3/8	24 3/8	24 3/8	24 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8	23 3/8
May	——	21	21	21 3/8	21 1/2	21 1/8	21 1/8	22 1/2	24 3/8	24 3/8	24 3/8	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2	21 1/2
June	——	20 3/4	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	19 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8
July	——	18 1/8	18 1/8	18 1/2	18 1/4	17 7/8	17 7/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8	18 1/8
Aug.	——	——	18 3/4	17 3/8	17 1/8	17 1/8	18 1/8	18 1/8	19 1/8	19 1/8	19 1/8	18 1/8	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4
Sept.	——	——	14 1/8	14 1/8	14 1/8	14 1/8	14 3/8	14 3/8	——	14 3/4	14 1/8	14 1/8	14 3/8	14 3/8	——	14 1/8	14 1/8	14 1/8	14 1/8	14 7/8	14 1/8	——	14 1/8	15 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	——	14 3/8	14 3/8
Oct.	——	——	14 1/8	14 1/8	14 1/8	14 1/8	14 3/8	14 3/8	——	14 3/4	14 1/8	14 1/8	14 3/8	14 3/8	——	14 1/8	14 1/8	14 1/8	14 1/8	14 7/8	14 1/8	——	14 1/8	15 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	——	14 3/8	14 3/8
Nov.	——	——	14 1/8	14 1/8	14 1/8	14 1/8	14 3/8	14 3/8	——	14 3/4	14 1/8	14 1/8	14 3/8	14 3/8	——	14 1/8	14 1/8	14 1/8	14 1/8	14 7/8	14 1/8	——	14 1/8	15 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	——	14 3/8	14 3/8
Dec.	——	——	14 1/8	14 1/8	14 1/8	14 1/8	14 3/8	14 3/8	——	14 3/4	14 1/8	14 1/8	14 3/8	14 3/8	——	14 1/8	14 1/8	14 1/8	14 1/8	14 7/8	14 1/8	——	14 1/8	15 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	——	14 3/8	14 3/8
1938																																
Jan.	——	——	14 1/8	14 1/8	14 1/8	14 1/8	14 3/8	14 3/8	——	14 3/4	14 1/8	14 1/8	14 3/8	14 3/8	——	14 1/8	14 1/8	14 1/8	14 1/8	14 7/8	14 1/8	——	14 1/8	15 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	——	14 3/8	14 3/8
Feb.	——	14 1/2	14 1/8	14 1/8	14 1/8	14 1/8	14 3/8	14 3/8	——	14 3/4	14 1/8	14 1/8	14 3/8	14 3/8	——	14 1/8	14 1/8	14 1/8	14 1/8	14 7/8	14 1/8	——	14 1/8	15 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	——	14 3/8	14 3/8

Average Spot Closing Prices— Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1911-1930

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98

Average Monthly Price per Pound Since 1930

	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents
Jan.	8.34	4.38	3.08	9.32	13.10	14.35	21.37	14.63
Feb.	7.70	4.03	2.95	10.45	12.92	15.48	21.33	
Mar.	7.71	3.35	3.01	11.01	11.51	15.89	24.09	
Apr.	6.43	3.02	3.56	12.10	11.55	15.98	23.44	
May	6.49	3.09	4.95	13.26	12.05	15.62	21.14	
June	6.35	2.66	6.15	13.51	12.57	15.85	19.29	
July	6.37	2.89	8.01	14.60	12.10	16.49	18.86	
Aug.	5.38	3.63	7.31	15.47	11.98	16.25	18.37	
Sept.	5.08	3.84	7.30	15.36	11.55	16.46	18.55	
Oct.	4.87	3.65	7.64	13.96	12.62	16.55	16.28	
Nov.	4.65	3.44	8.66	13.04	13.15	17.97	14.60	
Dec.	4.64	3.24	8.87	12.98	13.28	20.01	15.41	
Average for Year	6.17	3.49	5.96	12.92	12.37	16.41	19.39	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1937 Nov.	1937 Dec.	1938 Jan.	1938 Feb.	Day	1937 Nov.	1937 Dec.	1938 Jan.	1938 Feb.
1	7 1/8	7 1/8	——	7	17	7	7 1/4	7 1/16	
2	7 3/8	7 1/8	——	7	18	7 1/16	7 1/8	7 1/16	
3	7 1/8	7 1/2	6 1/2	6 7/8	19	6 7/8	——	7 1/16	
4	7 1/8	7 1/2	6 1/2	6 7/8	20	6 1/4	7 1/4	7 1/16	
5	7 1/8	——	6 7/8	6 7/8	21	——	7 1/8	7 1/16	
6	7 1/16	7 1/2	6 7/8	——	22	6 3/4	7 1/8	7 1/16	
7	——	7 1/8	6 1/2	6 3/8	23	6 7/8	7 1/16	7 1/16	
8	6 1/2	7 1/16	6 7/8	——	24	7 1/8	7 1/4	——	
9	6 7/8	7 1/2	——	——	25	7 1/8	——	7 1/16	
10	7 1/16	7 1/16	7 3/8	——	26	7 1/16	——	7 1/8	
11	——	7 3/8	7	——	27	7 1/16	——	7 1/16	
12	7 1/16	——	7 1/8	——	28	——	7 1/16	7 1/8	
13	7 1/4	7 1/4	7 1/8	——	29	7 1/8	6 7/8	7	
14	——	7 1/16	7 1/16	——	30	7 1/16	7	——	
15	7 1/8	7 1/16	7 1/16	——	31	——	6 7/8	7 1/8	
16	7	7 1/4	——	——					

Average Monthly Price Per Pound

Month	1935 Pence	1936 Pence	1937 Pence	1938 Pence	Month	1935 Pence	1936 Pence	1937 Pence	1938 Pence
Jan.	6.434	6.758	10.378	7.077	Aug.	5.696	7.581	8.830	
Feb.	6.292	7.255	10.503		Sept.	5.508	7.577	8.935	
Mar.	5.745	7.450	11.766		Oct.	6.130	7.898	7.855	
Apr.	5.604	7.502	11.471		Nov.	6.308	8.572	7.080	
May	5.822	7.335	10.250		Dec.	6.340	9.580	7.332	
June	6.027	7.352	9.548		Average for Year	5.976	7.713	9.424	
July	5.801	7.696	9.136						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1937 Dec.	1938 Jan.	1938 Feb.	Date	1937 Dec.	1938 Jan.	1938 Feb.	Date	1937 Dec.	1938 Jan.	1938 Feb.
1	8.00	——	8.51	11	8.17	8.72		22	8.48	8.53	
2	8.06	——	8.52	12	——	8.68		23	8.44	——	
3	8.08	8.38	8.55	13	8.21	8.68		24	8.43	8.60	
4	8.01	8.46	8.60	14	8.32	8.60		25	——	8.58	
5	——	8.48	8.64	15	8.29	8.63		26	——	8.54	
6	8.03	8.58	——	16	8.37	——		27	8.42	8.50	
7	7.97	8.58	8.61	17	8.31	8.60		28	8.40	8.44	
8	8.08	8.59	8.74	18	8.32	8.53		29	8.29	8.43	
9	8.20	——		19	——	8.59		30	8.35	——	
10	8.22	8.69		20	8.46	8.62		31	8.38	8.52	
				21	8.51	8.58					

Average Monthly Price Per Pound

	1935 Cents	1936 Cents	1937 Cents	1938 Cents		1935 Cents	1936 Cents	1937 Cents	1938 Cents
Jan.	12.70	11.91	13.06	8.57	Aug.	11.48	12.28	10.41	
Feb.	12.58	11.53	13.15		Sept.	10.80	12.31	9.02	
Mar.	11.63	11.43	14.46		Oct.	11.28	12.30	8.42	
Apr.	11.73	11.71	14.23		Nov.	12.01	12.23	7.96	
May	12.25	11.68	13.34		Dec.	11.99	12.83	8.26	
June	11.89	12.02	12.70		Average for Year	11.88	12.11	11.44	
July	12.26	13.11	12.26						

World Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1935	ON HAND 1936	ON HAND 1937	AFLOAT 1935	AFLOAT 1936	AFLOAT 1937	ON HAND AND AFLOAT 1935	ON HAND AND AFLOAT 1936	ON HAND AND AFLOAT 1937
Jan.	349,446	285,054*	201,915	42,066	43,870	55,096	391,512	328,924*	257,011
Feb.	340,264	282,902*	193,864	42,969	46,532	53,538	383,233	329,434*	247,402
Mar.	340,284	276,823*	191,928*	44,485	58,935	56,994	384,769	335,758*	248,922*
Apr.	337,586	277,478*	174,934	37,651	47,678	72,530	375,237	325,156*	247,464
May	322,558	262,415*	172,985	44,375	48,860	58,542	366,933	311,275*	231,527
June	324,218	245,544*	169,646	55,581	47,228	57,215	379,799	292,782*	226,861
July	334,692	235,850*	164,445	49,018	60,343	75,779	383,710	296,193*	240,224
Aug.	334,106	230,167*	171,052	47,724	63,597	80,439	381,830	293,764*	251,491
Sept.	331,121	233,336*	182,556	43,413	62,240	83,288	374,534	295,576*	265,844
Oct.	322,857	224,000*	195,685	49,913	67,825	80,653	371,770	291,825*	276,338
Nov.	308,993	211,48 *	217,586	46,588	73,691	81,302	355,581	285,171*	298,888
Dec.	303,000	223,000*	256,618	39,094	56,567	63,099	342,094	279,567*	319,717

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

Note: Complete figures for 1934 and 1935 were revised by the R.M.A. on May 1, 1936.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1935	London 1936	London 1937	Liverpool 1935	Liverpool 1936	Liverpool 1937
January	81,807	84,791	29,005	66,405	77,188	41,895
February	87,605	79,757	26,508	67,983	77,138	37,078
March	92,664	74,779	21,292	69,218	72,823	30,622
April	94,361	68,932	21,128	70,584	71,388	27,443
May	95,722	61,349	21,351	71,927	69,150	25,081
June	98,077	55,993	21,964	73,131	66,173	21,258
July	99,226	49,575	22,589	74,915	63,715	19,424
August	101,574	45,749	25,211	75,584	62,367	19,817
September	101,198	44,364	28,462	76,263	59,485	21,190
October	94,749	40,777	30,465	76,400	55,738	21,327
November	90,542	37,495	33,304	76,301	51,184	21,399
December	86,551	33,027	35,633	77,589	45,291	21,978

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

At end of 1937	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
January	36,365	41,911	5,024	290	4,005
February	42,132	44,346	5,855	197	3,763
March	42,485	40,317	3,477	108	4,078
April	38,812	38,443	3,745	101	3,840
May	34,234	40,253	3,781	94	3,559*
June	45,085	48,545	4,558	98	1,019
July	44,759	43,270	3,725	124	1,050
August	47,873*	44,775	4,454	144	1,133
September	49,438*	38,131	5,294	135	1,543
October	41,948*	43,900	4,743	117	1,780
November	38,803	45,854	5,378	105	2,901

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

End of:	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
1936:				
December	56,567	24,800	21,633	103,000
1937				
January	55,096	24,920	17,984	98,000
February	53,538	27,250	13,212	94,000
March	56,994	31,240	36,766	125,000
April	72,530	34,410	17,060	124,000
May	58,542	31,500	26,958	117,000
June	57,215	34,700	33,085	125,000
July	75,779	45,100	23,121	144,000
August	80,439	40,300	19,261	140,000
September	83,288	37,400	20,312	141,000
October	80,653	35,000	19,347	135,000
November	81,302	30,000P	15,698	127,000
December	63,099	32,000P	27,901	123,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1932	1933	1934	1935	1936*	1937
January	623,416*	634,797	661,948	698,153	600,479	454,249*
February	611,819*	626,227	663,308	686,195	599,355	445,265*
March	614,894*	638,428	666,382	678,809	583,318	447,856*
April	615,893*	629,159	658,796	677,006	567,172	428,249*
May	612,474*	626,537	689,239	677,569	541,871	413,134*
June	595,712	613,055	672,804	671,525	520,255	434,250*
July	589,037	618,258	676,200	679,061	519,074	445,782
August	597,274	617,449	674,702	680,644	500,520	457,462
September	599,986	623,683	694,361	661,509	493,585	470,768*
October	609,368	636,597	680,616	655,000	486,159	479,398*
November	614,342	642,968	684,408	617,300*	466,491	493,266*
December	629,898	654,890	705,975	613,987*	466,576	538,586
Monthly Avge.	609,502*	630,171	677,395	666,397*	528,738	458,939

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,903	12,323	11,004	6,635	13,437	13,355	11,798	16,142
Apr.-June	16,487	16,295	12,980	14,412	13,565	12,597	15,443	16,421
July-Sept.	11,522	12,004	9,245	14,707	9,822	11,312	15,467	12,659
Oct.-Dec.	9,050	8,117	6,856	9,550	10,406	12,099	15,409	10,043
Total	50,962	48,739	40,085	45,304	47,230	49,363	58,117	55,265

Shipment Figures on Quarterly Basis

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,318	11,268	8,760	6,981	10,730	11,154	10,944	14,667
Apr.-June	15,599	15,919	18,021	15,139	14,998	13,473	16,530	16,324
July-Sept.	15,027	14,354	8,141	13,707	11,648	13,489	14,558	13,591
Oct.-Dec.	9,694	8,510	5,329	8,265	9,310	12,066	13,331	10,864
Total	53,638	50,051	40,251	44,092	46,686	50,182	55,363	55,446

Inventory Figures [2]

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	12,513	10,014	9,878	7,290	11,651	11,675	9,087	12,488
Apr.-June	13,277	10,447	4,999	6,615	10,219	10,755	7,835	12,529
July-Sept.	9,812	8,158	6,096	7,595	8,419	8,288	9,012	11,615
Oct.-Dec.	9,003	7,775	7,644	8,888	9,455	8,196	11,114	10,776

Figures for Recent Months

	PRODUCTION 1935	PRODUCTION 1936	PRODUCTION 1937	SHIPMENTS 1935	SHIPMENTS 1936	SHIPMENTS 1937	INVENTORY 1935	INVENTORY 1936	INVENTORY 1937
Oct.	4,051	5,126	3,990	4,055	4,082	3,940	8,291	10,096	11,644
Nov.	3,997	4,972	3,111	3,930	4,233	3,771	8,249	10,823	10,963
Dec.	4,051	5,311	2,952	4,081	5,016	3,153	8,196	11,114	10,776

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	14,182	11,989	10,721	6,230	12,823	12,553	11,935	15,715
Apr.-June	15,995	15,388	11,913	13,001	13,191	11,631	14,678	15,299
July-Sept.	12,552	12,839	8,286	14,356	10,321	11,270	15,377	11,949
Oct.-Dec.	9,691	8,117	5,970	9,000	9,891	12,425	15,257	8,890
Total	52,420	48,333	36,890	42,587	46,226	47,879	57,247	51,853

Shipment Figures on Quarterly Basis

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,921	11,251	8,918	6,539	10,640	11,252	11,410	14,497
Apr.-June	15,187	15,314	16,271	13,292	14,553	11,928	15,169	15,380
July-Sept.	16,158	15,282	7,761	13,370	11,545	13,251	15,125	12,805
Oct.-Dec.	9,672	8,174	4,961	8,189	8,306	11,636	12,921	9,741
Total	54,938	50,021	37,911	41,390	45,044	48,067	54,625	52,423

Inventory Figures [2]

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,179	10,475	9,448	6,369	10,244	10,406	8,692	11,904
Apr.-June	13,612	10,504	5,174	6,097	8,795	10,050	8,105	11,746
July-Sept.	10,065	8,095	5,753	7,008	7,639	7,565	8,627	11,242
Oct.-Dec.	9,999	7,922	6,749	7,815	9,180	8,231	10,985	10,056

Figures for Recent Months

	PRODUCTION 1935	PRODUCTION 1936	PRODUCTION 1937	SHIPMENTS 1935	SHIPMENTS 1936	SHIPMENTS 1937	INVENTORY 1935	INVENTORY 1936	INVENTORY 1937
Oct.	4,435	5,397	3,719	3,987	4,108	3,518	8,053	9,977	11,103
Nov.	3,942	4,739	2,822	3,687	3,995	3,348	8,161	10,732	10,527
Dec.	4,048	5,121	2,349	3,962	4,819	2,875	8,231	10,985	10,056

[1] Based on reports received from the Rubber Manufacturers Association.
[2] Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,124
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,809,565	3,915,863	893,702	207,000	152,631	54,369	5,016,565
1937*							
Jan.	380,055	309,637	70,418	19,583	14,697	4,886	399,638
Feb.	363,995	296,636	67,359	19,707	14,173	5,534	383,702
Mar.	494,277	403,879	90,398	24,901	19,127	5,774	519,178
Apr.	536,339	439,980	96,359	17,081	12,927	4,154	553,420
May	516,919	425,432	91,487	23,458	17,980	5,478	540,377
June	497,311	411,394	85,917	23,841	17,919	5,922	521,152
July	438,971	360,403	78,568	17,941	12,513	5,428	456,912
Aug.	394,330	311,456	82,874	10,742	5,814	4,928	405,072
Sept.	171,203	118,671	52,532	4,417	1,926	2,491	175,620
Oct.	329,876	298,662	31,214	8,103	7,378	725	337,979
Nov.	360,055	295,328	64,727	16,574	13,793	2,781	376,629
Dec.	326,234	244,385	81,849	20,652	14,384	6,268	346,886

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [4]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [3]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [4]	World Total [5]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,088	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,063	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1936:															
Apr.	36,251	14,702	21,549	3,172	1,230	2,053	869	1,596	4,895	6,446	13,032	2,416	1,056	947	59,261
May	46,568	12,527	34,041	2,560	1,117	2,354	517	2,077	4,258	6,015	10,766	2,281	956	776	67,718
June	40,049	15,026	25,023	3,766	1,226	1,386	461	3,737	4,577	6,519	14,588	2,733	917	823	65,756
July	53,114	19,038	34,076	3,773	1,359	1,399	1,035	3,734	6,133	8,578	17,946	2,738	964	933	82,668
Aug.	43,506	13,361	30,145	3,940	776	2,541	656	3,284	4,978	7,353	12,106	3,017	542	1,054	70,392
Sept.	44,110	10,039	34,071	5,367	664	1,139	537	3,259	4,531	6,241	10,175	3,505	1,119	937	71,545
Oct.	46,543	12,960	33,583	5,599	1,181	2,143	1,086	3,349	6,477	8,145	12,881	3,874	1,255	1,105	80,678
Nov.	47,342	16,923	30,419	4,960	1,322	1,950	701	2,260	5,398	7,109	16,718	3,872	1,592	1,163	77,464
Dec.	38,714	9,758	28,956	4,377	1,844		506	2,988	6,472	10,129	9,536	8,450	1,721	1,087	76,072
1937:															
Jan.	41,571	16,956	24,615	4,541	1,077	4,063	1,234	3,849	5,136	8,011	13,102	2,828	1,271	1,000*	70,727
Feb.	38,058	14,048	24,010	5,619	1,831	2,043	790	3,554	5,484	7,656	12,414	3,074	1,692	1,000*	69,167
Mar.	59,568	19,579	39,989	7,066	2,040	1,425	1,239	3,873	7,791	11,848	19,969	3,173	1,749	1,000*	101,162
Apr.	58,718	17,136	41,582	3,423	1,203	2,960	783	1,899	6,999	8,967	15,989	2,094	1,522	1,000*	88,421
May	51,152	17,350	33,802	4,612	1,012	742	778	2,238	7,530	8,981	21,085	2,887	1,063	1,000*	85,730
June	54,809	23,614	31,195	5,180	1,100	1,890	813	2,933	8,269	12,467	25,225	3,669	762	1,000*	94,503
July	72,704	26,100	46,604	6,285	976	2,543	1,414	3,195	7,512	11,610	23,913	5,563	854	1,000*	111,469
Aug.	64,525	21,398	43,127	7,336	605	1,624	1,189	2,999	6,785	11,635	21,054	2,272	1,248	1,000*	100,874
Sept.	67,414	19,065	48,349	5,771	1,092	2,659	969	3,173	6,402	10,882	19,371	4,128	1,007	1,000*	104,803
Oct.	59,319	11,858	47,461	6,702	1,178	523	1,505	2,352	6,587	12,198	14,087	3,751	1,434	1,000*	98,778
Nov.	57,850	12,396	45,454	4,337	2,128	2,517	1,327	2,549	6,310	10,003	11,596	4,556	963	1,000*	92,740
Dec.	56,791	13,949	42,842	9,709	3,127	3,009	1,172	2,159				5,384	1,000*	1,000*	102,596

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories

* Figure is provisional; final figure will be shown when available

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,024	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	17,000*	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,976
1936:															
Aug.	41,094	—1,581	4,513	6,556	3,781	4,305	1,500*	3,128	807	789	42	1,145	500*	989	67,440
Sept.	49,483	—12	4,393	6,006	2,393	5,195	1,500*	2,922	2,297	514	471	1,090	300*	624	77,176
Oct.	40,301	—87	4,752	7,232	3,110	6,600	1,500*	2,761	1,092	817	343	1,171	200*	1,026	70,818
Nov.	37,897	—742	3,282	6,500	4,308	3,961	1,500*	2,162	964	1,090	445	1,388	200*	823	63,778
Dec.	50,838	—4,926	4,688	7,458	1,193	8,698	1,500*	3,426	1,184	759	276	1,206	200*	1,701	78,201
1937:															
Jan.	42,655	33	4,430	7,041	1,632	8,357	1,700	2,633	582	854	269	1,115	200*	567	72,368
Feb.	44,398	—222	5,296	7,911	1,271	6,630	1,502	3,048	304	1,363	245	452	200*	837	73,233
Mar.	39,888	343	5,347	7,668	2,612	6,935	2,119	3,598	1,293	1,641	371	709	200*	601	72,727
Apr.	42,066	3,808	5,291	8,664	1,343	5,837	1,669	1,532	1,058	1,069	362	1,070	200*	1,445	80,414
May	48,506	6,100	5,558	6,706	4,187	8,596	2,772	1,886	1,290	2,113	361	1,576	200*	925	90,776
June	48,972	5,157	6,010	6,469	3,791	7,608	1,958	3,940	2,226	1,630	521	1,802	200*	1,150	91,434
July	43,018	10,628	4,306	7,860	1,946	4,851	2,719	2,150	1,902	851	497	1,409	200*	753	83,090
Sept.	56,685	15,671	4,820	10,595	2,396	3,666	1,941	1,226	3,184	1,258	337	1,648	200*	1,369	104,996
Nov.	54,135	12,878	4,311	8,848	4,787	1,500*	2,857	2,500*	1,935	925	313		200*	846	
Dec.	69,660	10,655							7,727						

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials —

ACCELERATORS—
El-Sixty, Ureka C, Guantal, Ureka, A-1, A-10, A-19, A-32, A-100, Pipsolene, Pip-Pip, DPG, R-2.
ANTIOXIDANTS — Flectols B, H, White.
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Bldg., Akron, Ohio

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 26 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK—*Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

RATES
for Listings in this Section

$5.00 per listing per month.

10% Discount if 2 listings per month are used.

15% Discount for 3 or more listings per month.

Copy Subject to Style Regulations.
No cuts accepted.

CARBON BLACK
CONTINENTAL
The Newest Name in Carbon Black offers
CONTINENTAL DUSTLESS
CONTINENTAL COMPRESSED
CONTINENTAL UNCOMPRESSED
Continental Carbon Company
295 Madison Ave., New York, N.Y.

CARBON BLACK—*Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Grant Building, Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

CHEMICALS
For Rubber — For Industry Generally
Accelerators — *Acids* — *Latex*
Antioxidants — *Oil of Myrbane* — *Lotol*
Specialties — *Aniline Oil* — *Dispersions*
NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

CHEMICALS and Mineral
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosenbank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Building
Akron, Ohio

THE MARKET PLACE Section Continued on Next Page

AminoX

A GENERAL PURPOSE ANTIOXIDANT WITH SPECIAL EMPHASIS ON HEAT RESISTANCE

AMINOX is a powdered modification of B-L-E. It disperses and processes well in rubber, and discolors *very little*.

SAMPLES AVAILABLE ON REQUEST

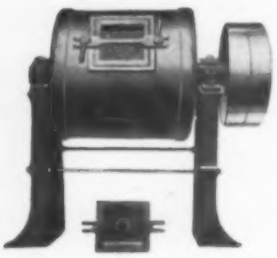
Chemical Division

Naugatuck Chemical

DIVISION OF UNITED STATES RUBBER PRODUCTS, INC.

1790 BROADWAY NEW YORK, N. Y.

Rubber Plant Equipment



PEBBLE MILL

Specially adapted for making dispersions of compounding materials for latex use. Built in sizes up to 45 in. diameter with capacity of 144 gallons.

We make equipment of practically every type for all requirements of small and large factories

Specialists in

LATEX EQUIPMENT

PEBBLE and BALL MILLS, MIXERS, SPREADERS

PATENTED MIXER

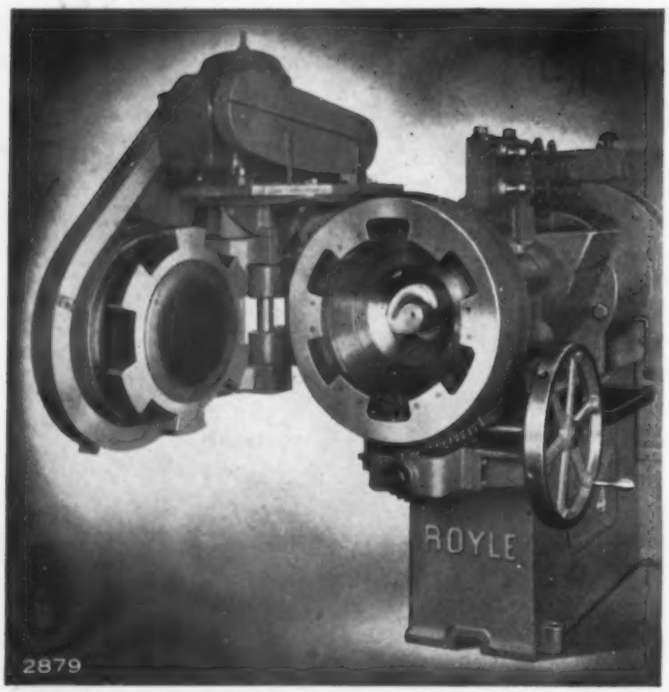
The only mixer suitable for Latex. Can be used under Vacuum or Pressure. Ideal for de-airing and evaporating. Available in sizes up to 330 gal. capacity. Made in Standard or Stainless Steel.

CONTINENTAL MACHINERY COMPANY

277 Broadway, New York, N. Y.

Telephone:
WOrth 2-1650, 1651

Cable Address:
"Contimac" New York



TWO STRAINERS NOW DO THE WORK OF THREE

8½ Inch Royle Does 30% More Work

In a plant where three strainers were formerly in operation, the management recently installed a Royle 8½ inch strainer. One of the old strainers was held in reserve. With this new set-up they do all the work that formerly required three machines with ample margin for greater production needs.

ROYLE STRAINERS

Made in six sizes 3¼ to 10 inches

are built for continuous high speed production, with quiet, powerful herringbone gears, roller bearings and automatic lubrication throughout.

Illustration shows hinged, quick-opening breech lock strainer head and motor driven rotary cut-off.

J.C.CLINEFELTER
AKRON, OHIO
JEFFERSON 9638

JOHN ROYLE & SONS

SELSON MACHINE TOOL COMPANY Ltd.
LONDON, ENG.

SHERWOOD 2-8262 PATERSON · NEW JERSEY CABLE ROYLE PATERSON

Bag to Bag

UNIFORMITY

★

..the outstanding characteristic of

ST. JOE ZINC OXIDE

LEAD FREE • AMERICAN PROCESS

Produced by Our Patented Electro-Thermic Process

★

ST. JOSEPH LEAD CO.

250 PARK AVENUE • NEW YORK

PLANT AND LABORATORY:
JOSEPHTOWN, BEAVER CO., PA.

FOR YOUR PROTECTION!

YOUR GOOD PRODUCTS will be even better with controlled Latex! For your protection, we rigidly control the quality and the uniformity of Latex by (1) careful plantation supervision; (2) shipment in bulk, to minimize variation; (3) scientific processing, and continuous laboratory control. We carry stocks on hand...*Normal*, *Concentrated*, and *Processed*, for immediate delivery.

LATEX

NAUGATUCK CHEMICAL

Division of United States Rubber Products, Inc.
1790 Broadway New York, N. Y.

PEQUANOC STANDARDS

RECLAIMED RUBBER

▼ ▼ ▼

. . . . UNIFORMITY SERVICE . . . . .

PEQUANOC RUBBER COMPANY

BUTLER, N. J.

ROBERT KNOBLOCK.
Mid-western Representative
2301 Lincoln Way West
Mishawaka, Indiana

HAROLD P. FULLER.
New England Representative
31 St. James Ave.
Boston, Mass.

E. B. ROSS,
Canadian Representative
No. 1 Toronto Street,
Toronto, Ontario, Canada

HECHT, LEVIS & KAHN, Ltd.
European Representative
17 St. Dunstan's Hill, E.C. 3
London, England

...a Titanox Pigment which gives notable improvement to heavily loaded WHITE RUBBER products

GOOD WHITENESS AT LOW COST

Magnesium silicate, the base of Titanox-M, has a low specific gravity and high volume. When combined with titanium dioxide, the pigment so formed demonstrates the advantages of good masking and whiteness at low volume cost. Like Titanox-A and Titanox-C, Titanox-M is chemically stable and inert.

Our Service Department will gladly furnish samples and full technical information.

Rubber men will welcome this newest addition to the Titanox group because it will help to simplify many of their formulating problems. It is called Titanox-M (Titanium Magnesium Pigment) and it is especially adapted to those products in which a higher pigment loading is desirable such as boots, shoes and other molded articles.

Titanox-M mixes easily and quickly in the batch. It makes for stiffer stocks, has nice processing qualities and good color.

TITANIUM PIGMENT CORPORATION

Sole Sales Agent

111 Broadway, New York, N. Y.; Carondelet Station, St. Louis, Mo.; National Lead Company (Pacific Coast Branch) 2240 24th St., San Francisco, Calif.

TITANOX

TITANOX TRADE MARK

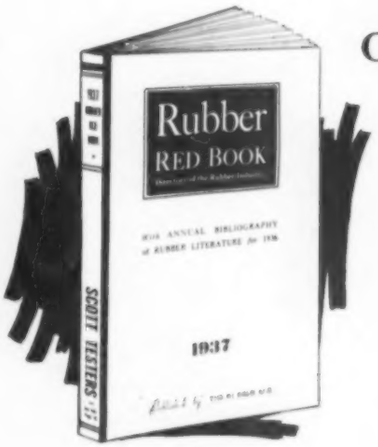
WEIGHT
CORRECT TO THE OUNCE

Special care is taken at Continental to assure users of carbon black that there will be no variation in the weight of bag contents. Here the operator, using the most modern weighing and packing equipment, is packing off Dustless Black and watching the scale to shut off the flow at the correct weight—to the ounce. This is just one of the many reasons why Continental's product can be used, bag after bag, in customers' formulae with the utmost confidence in achieving uniform results.

CONTINENTAL CARBON COMPANY • 295 MADISON AVE., NEW YORK, N. Y.

Continental

The Only Available Directory of the Rubber Industry



1937 RUBBER RED BOOK

CONTENTS

RUBBER MANUFACTURERS IN THE UNITED STATES
- Alphabetical Section
- Geographical Section
- Classified List of Rubber Products

RUBBER MANUFACTURERS IN CANADA

RUBBER MACHINERY AND EQUIPMENT
- Classified List of Machinery
- Machinery Manufacturers

RUBBER CHEMICALS AND COMPOUNDING MATERIALS
- Classes of Chemicals
- Brand Names
- Chemical Concerns

FABRICS AND TEXTILES

RECLAIMED RUBBER

CRUDE RUBBER DEALERS, BROKERS AND AGENTS

MISCELLANEOUS TYPES OF RUBBER
Balata; Chicle; Chlorinated Rubber; Chloroprene Rubber; Dispersed Rubber; Guayule; Gutta-Percha; Master Batches; Oil-Resistant Rubber; Polysulphide Rubber; Powdered Rubber; Softened Rubber.

SCRAP RUBBER DEALERS

RUBBER LATEX (Including an article on Latex Compounding, by Dr. Royce J. Noble)

CONSULTING TECHNOLOGISTS

MISCELLANEOUS PRODUCTS
Printing Inks; Processed Liners; Processed Paper; Rubber Labels; Rubber-to-Metal Bonding Agents; Waterproof Coatings; Wax Crayons; Wire Insulation.

BIBLIOGRAPHY OF RUBBER LITERATURE FOR 1936
Compiled by D. E. Cable, Ph.D., Ch.E.

BOOK SECTION (Recent Books on Rubber)

A valuable compilation which will be found of daily use by Rubber Plant Executives, Purchasing Agents, Technologists, etc., etc., as well as by Suppliers of Equipment and other Materials or Services used by Rubber Manufacturers. Industrial concerns buying rubber products will also find this Directory indispensable in locating sources of supplies for all types of rubber goods.

●

372 Pages—6 x 9 in.—Paper and Cloth Bound Editions
PRICE: Paper Binding, $2.00; Cloth Binding, $3.00

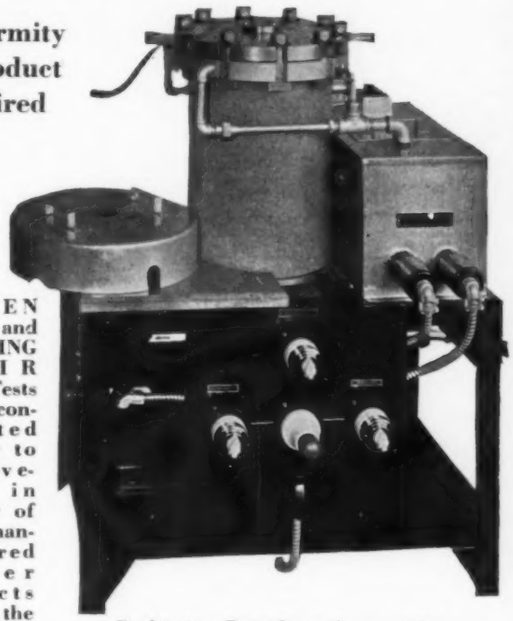
Send Orders to

THE RUBBER AGE

250 West 57th Street **New York, N. Y.**

Control of MANUFACTURING PROCESSES is at the *Laboratory* when

Uniformity of Product is Desired



OXYGEN AGING and AIR AGING or AIR HEAT Tests have contributed greatly to improvement in quality of many manufactured rubber products during the last decade.

Combination Bierer-Davis Oxygen Aging and Air Pressure Heat Test Outfit

EMERSON APPARATUS CO.
183 Tremont Street Melrose, Mass.

Leaders in Holland Cloth

THEY QUALIFY ON ALL THREE COUNTS

•

FINEST FINISH OR GLAZE

•

NO FLAKING

•

FREE FROM PINHOLES

EAGLE BRAND
The finest Holland Cloth for **hot cures** in rubber mills. Retains its whiteness of color under heat and calendering.

CARDINAL BRAND
Recommended for **cold cures** when low temperature is used in the processing or in the vulcanizing by the consuming trade.

Standard Widths: 20", 30" and 40". Length of Rolls: 100 yds. and 250 yds.

Send for prices and a copy of our new catalog containing samples on these superior Holland Cloths which are used by leading rubber manufacturers.

ARKWRIGHT FINISHING COMPANY
PROVIDENCE, RHODE ISLAND
Sales Office: Rockefeller Bldg., Cleveland, Ohio
Pacific Coast Agents: L. H. Butcher Co.—San Francisco and Los Angeles

LATEX

NORMAL-CONCENTRATED-PROCESSED

LATEX In The Form Most Suitable For Your Requirements

UNIFORM STANDARIZED RELIABLE

Ample Stocks Always On Hand For Immediate Delivery

Trade Mark

HEVEATEX CORPORATION

78 GOODYEAR AVE. MELROSE, MASS.

Trade Mark

NEW YORK, N. Y. CHICAGO, ILL. AKRON, OHIO.

One of the industry's indispensable reference books

"RUBBER—Physical and Chemical Properties"

By T. R. DAWSON—Head of Information Bureau, Research Ass'n of British Rubber Manufacturers

and B. D. PORRITT—Director, Research Ass'n of British Rubber Manufacturers

Published by
The Research Association of British Rubber Manufacturers

This voluminous book brings together for the first time detailed information on the physical and chemical properties of rubber. It contains data from over 1400 papers, pamphlets and books, and is indispensable to rubber manufacturers as well as to the user and purchaser of rubber goods.

The book should be in the library of every rubber research worker, chemist, physicist and engineer. Not only does it record detailed results of the effect and action of hundreds of compounding ingredients but in addition contains tables bearing on all the special phenomena related to vulcanization, on ageing, and on the variability of crude rubber. It also contains a mass of information of value to the user of latex. In addition, a section is devoted to methods of analysis and testing and to specifications.

700 pages — 9 x 11 inches — completely indexed.

PRICE: $12.50 Postpaid

Available from Book Department of

THE RUBBER AGE

250 West 57th Street New York

A copy of this book should be in the technical library of every rubber factory.

SAVE MONEY
on Softeners

Use X-1 RESINOUS OIL

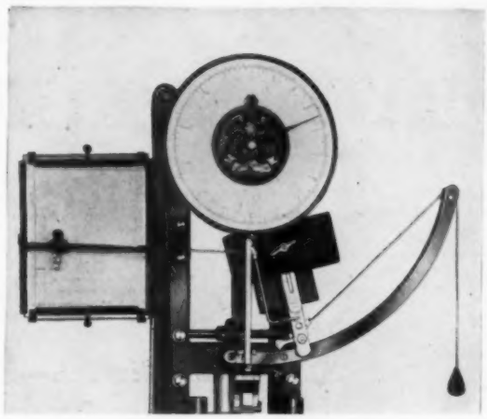
- Neoprene Stocks
- Rubber Compounding
- Reclaiming Operations

An inexpensive, powerful, efficient Softener and Plasticizer.

MAY WE SEND A SAMPLE?

THE NEVILLE COMPANY
PITTSBURGH, PA.
13-R

SCOTT TESTER



This illustration of the head of a Scott Tensile Tester, Model L-3, shows the method of adjusting the machine to compute automatically the test from specimens of various thicknesses to the common language of *Tensile Per Square Inch*—one of the exclusive features of this Scott Tester.

HENRY L. SCOTT CO.
101 Blackstone St., Providence, R. I.

RANDALL & STICKNEY
Hand Grip Rubber Gauge No. 3-B

Height .....9"	Length .....9¾"	Range .....½"
Depth of Throat ....6½"	Dial 50 Divisions Each Div. 1/1000"	Weight .... 4 lbs. Frame . Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL, Waltham, Mass.

REVERTEX

for Quality and Economy in Combining Backing Impregnation of Textiles

R X

For DRY COMBINING, Compound 204 is of great advantage. Containing no curing ingredients, it dries with sufficient tack to form a strong permanent bond. Absolutely non-staining. Available in black and white.

Write for information and samples to:

REVERTEX CORPORATION OF AMERICA
80 BROAD ST. NEW YORK, N. Y.

Now Available

LATEX & RUBBER DERIVATIVES and Their Industrial Applications

By Frederick Marchionna, *M. S. Chem.*

Second Edition—In Two Volumes (Vol. II & III)

1700 Pages—6 x 9 in.—22 Chapters

SINCE the publication of the first issue of Marchionna's bibliography on latex ("Latex and Its Industrial Applications") in 1933, the author has been urged by many technologists, research workers and others to bring out a supplement covering the period from June, 1932, to date. The present book is the result—a book which incorporates many of the suggestions made by users of the first edition.

The author has followed the same plan in general which brought so many favorable comments on the first edition. The scope of the work, however, has been broadened to cover Rubber Derivatives—rubber hydrochloride, chlorinated rubber, cyclized rubber, oxidized and hydrogenated rubber, etc. This is due to the wide interest and research being conducted on these materials. As the author points out in his preface there is a great interdependence between Latex and Rubber Derivatives, and covering both subjects in one book has resulted in the elimination of a number of cross references.

That the past four years have seen greater advances in the use of Latex than in the entire previous history of the art is indicated by the fact that whereas Marchionna's first book contained 2,450 abstracts of Latex Patents and Literature, the present edition, covering the period from July, 1932, to January, 1937, a period of only four and one-half years, contains 2,932 abstracts on the subject. The section devoted to Rubber Derivatives, which goes back to the earliest patents and literature, includes 941 abstracts.

The present volume will be found indispensable to every present and prospective user of Latex or Rubber Derivatives. It abstracts every patent on these subjects (for periods above explained) issued in the United States, England, France and Germany, as well as every essential technical article which has appeared in hundreds of technical journals throughout the world. Every owner of Marchionna's first volume, and everyone interested in Latex or Rubber Derivatives, will require this new book to keep posted on the latest developments in the technology and use of these materials.

What Dr. Bruni, of the Pirelli Company, says about this new book in his Foreword:

". . . the completeness of the work is more satisfactory than in the first volume; the classification has been made more rational and greater explanations are offered to the reader to facilitate his perusal of the book. A substantial and welcome contribution is made by the introductions to several chapters which have been contributed by a number of competent experts

. . . An innovation is supplied by the inclusion of a subject which has lately acquired great importance and which offers increasing interest for the rubber and allied industries, namely, *Rubber Derivatives*. It may be objected that such subjects have only an indirect relation to latex, and very often have no connection with latex technique, but I am sure that all investigators interested in these matters will heartily welcome this new volume which offers them a valuable guide through a very intricate field by collecting so many single contributions up to now scattered and not easily available

. . . It is my earnest conviction that very few (if any) domains of technical knowledge and industrial applications possess today a reference work so reliable and so thoroughly exhaustive as that of latex. I express to Mr. Marchionna the best thanks of all associated with rubber science and industry for his untiring and efficient labor, and for the important results achieved."

Index to Contents

"LATEX & RUBBER DERIVATIVES—and Their Industrial Applications"

(In Two Volumes)

VOL. II

PART I—LATEX AND ITS INDUSTRIAL APPLICATIONS

I. Latex and Its Properties.

II. Conditioning of Latex—*Introduction by John McGavack,* U. S. Rubber Products, Inc.

III. Vulcanized Latex and Vulcanization Processes—*Introduction by P. Schidrowitz,* Consulting Rubber Chemist, London.

IV. Compounding and Compounded Latex—*Introduction by P. Schidrowitz,* Consulting Rubber Chemist, London.

V. Deposition Latex Processes and Dipped Articles—*Introduction by C. L. Beal,* American Anode, Inc.

VI. Rubber Threads and Filament Manufacture—*Introduction by D. F. Twiss,* Chief Chemist, Dunlop Rubber Co.

VII. Textile Fabric Manufacture.

VIII. Paper and Artificial Leather Manufacture—*Introduction by Geo. A. Richter and M. O. Schur,* Brown Paper Co.

IX. Coating and Impregnation: Generic—*Introduction by A. Szegvari,* American Anode, Inc.

X. Electrical Insulation.

XI. Porous Rubber Products—*Introduction by D. F. Twiss,* Chief Chemist, Dunlop Rubber Co.

XII. Floor and Road Coverings.

XIII. Shoe Manufacture.

VOL. III.

XIV. Rubber Powders.

XV. Miscellaneous Processes and Products.

XVI. Artificial Latex and Mixed Dispersions.

XVII. Electrodeposition of Rubber—*Introduction by C. L. Beal,* American Anode, Inc.

PART II—RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS.
Introduction, "The Composition and Structure of the Rubber Hydrocarbon" by *Harry L. Fisher,* U. S. Industrial Alcohol Co.

XVIII. Oxidized Rubber.

XIX. Hydrogenated Rubber.

XX. Halogenated Rubber Products.

XXI. Cyclized Rubber—*Introduction by L. B. Sebrell and E. J. Morris,* Goodyear Tire and Rubber Co.

XXII. Condensation Products of Rubber.

Author and Subject Indexes

Index of Patents—Index of Patentees

The supply of VOL. I is very limited and when present copies are exhausted no more will be available. It is suggested, therefore, that VOL. I be ordered with VOLS. II and III (taking advantage of the special combination offer) in order to assure yourself of complete information on latex patents and literature.

●

PRICE: VOLS. II and III (not sold separately) $20.00

VOL. I (Latex and Its Industrial Applications) $15.00

Special Combination Price—VOLS. I, II and III $30.00

(Combination price offer good only to Nov. 15, 1938)

Published by

THE RUBBER AGE

250 West 57th Street New York, N. Y.

SCRAP RUBBER
CRUDE RUBBER
HARD RUBBER DUST

A. SCHULMAN Inc.
AKRON, OHIO 1006 AKRON SAVINGS AND LOAN BUILDING
BOSTON, MASS. 638 STATLER BLDG.
E. ST. LOUIS, ILL. 1401 MISSISSIPPI AVE.

BIG
as a

A slight exaggeration, we admit . . . but once you have occupied one of the beautiful new rooms in Hotel McAlpin, you will agree there is a cheery spaciousness to our rooms seldom found elsewhere. Everything in these big beautiful rooms is new . . . carpets, draperies, furniture and fixtures . . . and yet so comfortably homelike that you wonder how such luxury can be enjoyed at such moderate cost.

*HOUSE John J. Woelfle, Mgr.

HOTEL McALPIN
"The Center of Convenience"
Broadway at 34th Street
NEW YORK

ROOMS with BATH from
$2.50 Single $4.00 Double $4.50 Twin Bedded

WHITTAKER
ESTABLISHED 1890
Standard for 48 years
MAGNESIA
Whittaker, Clark & Daniels, Inc.
IMPORTERS—MANUFACTURERS—EXPORTERS
260 WEST BROADWAY NEW YORK CITY

COLORS for RUBBER
Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides
•
Reinforcing Fillers
and Inerts
C. K. WILLIAMS & CO.
EASTON, PA.

"They've Got What it Takes"

FREMONT CUTTING DIES of scientifically tempered imported steel STAY SHARP. Uniform height, correct outside bevel and inside slope or clearance assure even cutting pressure, prevent clogging and eliminate spoilage, repairs and delay. Depend on Fremont engineering service. Send patterns or blue prints.

Sales representatives for Rawhide Mallets.

FREMONT TOOL & DIE CO.
432-438 N. Wood St.
Fremont, O.

MANDRELS
STOCK SHELLS
HOSE POLES
Air Bag BUFFERS

Send us your inquiries.

For 28 years we have been supplying dependable Calender Stock Shells and Mandrels of all types to leading rubber plants throughout the world.

We can furnish a type for every need. We also make Hose Poles, Air Bag and Side Wall Buffing Machines and Mandrel Polishers.

•

The National Sherardizing & Machine Co.
868 Windsor St. Hartford, Conn.
Representatives in Akron, California and New York

Materials for Rubber Compounding

SMITHKO PRODUCTS

CLAY	WAXES
MICA	WHITING
TALC	MAGNESIA
BARYTES	GREEN OXIDE
RED OXIDE	CARBON BLACK

SMITH CHEMICAL & COLOR CO.
55 John St. Brooklyn, N. Y.

"METALINE"
(REGISTERED TRADE MARK)

Metaline Oilless Bronze Bearings Never Need Oil

Standard Two-piece Bearing

R. W. RHOADES METALINE CO., INC.
30 West Ave. Long Island City, N. Y.

1880 *Rand* 1938

RUBBER GOODS

"They Last Longer"

DRESS SHIELDS	BABY BIBS
DRESS SHIELD LININGS	HOUSEHOLD APRONS
BABY PANTS	SANITARY BELTS
CRIB SHEETS	APRONS—BLOOMERS
BATHING CAPS	SKIRTS—STEPINS
RUBBERIZED SHEETING	CHILDREN'S APRONS

SHEETED RUBBER—PLAIN & RANDPRINT—For Manufacturers

RAIN CAPES and COATS

RAND RUBBER CO., Brooklyn, N. Y.

RMP
ANTIMONY
FOR RED RUBBER

ATTRACTIVE ... NON-DETERIORATING

RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

MECHANICAL MOLDED RUBBER GOODS

Sponge Rubber: Sheeted—Die Cut—Molded

We Solicit Your Inquiries

THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

The CARTER BELL MFG CO

CARTER BELL STANDARD SINCE 1903 RUBBER SUBSTITUTES

150 Nassau Street New York

12 Issues a Year

$2.00 Annual Subscription

THE RUBBER AGE

NEOPHAX Reg. U. S. Pat. Off. — **Vulcanized Vegetable Oils FOR NEOPRENE**

"Neoprene can be loaded with FACTICE and fillers to a greater extent than rubber and yet retain its rubber-like properties to a remarkable degree. Such stocks tube smoothly and rapidly, calender nicely at low heats and, when vulcanized, give snappy, rubbery stocks."

Reg. U.S. Pat. Off.

THE STAMFORD RUBBER SUPPLY CO. STAMFORD CONN.
Makers of FACTICE Since 1900
Reg. U.S. Pat. Off.

CHEMISTRY and TECHNOLOGY of RUBBER

Edited by C. C. Davis and John T. Blake

A.C.S. Monograph No. 74

REMARKABLY comprehensive in its scope, this official publication of the A.C.S. Rubber Division at last provides an authoritative reference book on both the theoretical and practical aspects of rubber technology. The fact that each chapter has been contributed by an expert or group of collaborators, especially eminent in their own particular fields, gives the book an authority, and a compelling interest, obtainable in no other way. For each special subject great care has been exercised to furnish adequate historical perspective for the most significant presentation of recent developments. Other attractive features are extensive bibliographies conveniently placed at the end of each chapter, and an unusually complete index, particularly emphasizing cross-references. A final chapter devoted to concise discussion of the literature of rubber chemistry also increases the utilitarian character of this volume.

IN view of the notable advances in rubber manufacture during the past two decades, the appearance of this monograph is especially timely. Emphasis is placed on the latest technical developments in the manufacturing industry, which have grown out of such research achievements as the x-ray study of a configuration of the rubber molecule; a more complete understanding of the behavior of rubber in liquids; and the growing realization of the basic changes in physical structure developed during reinforcement loading and vulcanization.

THE special value of this book lies in the fact that the exposition of these recondite theoretical studies is well balanced by the comprehensive discussion of up-to-date manufacturing practice. The exhaustive treatment of the mechanism of the aging, oxidation, and deterioration of rubber on exposure to light and heat, for example, is supplemented by a complete list of commercial anti-oxidants and age-resisters, and by a detailed description of the beneficial effect of other compounding ingredients in this respect. The fundamental, mathematical physics of vulcanized rubber, is offset by a chapter on current standard test methods and physical testing equipment. Fundamental theorizing as to the mechanism of acceleration, or the nature of vulcanization, is balanced by practical comments on compounding materials, and by a complete compilation of routine analytical methods for crude rubber and for commercial vulcanized rubber products. Specialized subjects such as rubber reclaiming; balata and gutta percha; synthetic rubber and rubber substitutes receive adequate treatment.

The result is that the book has a universal appeal, to the research investigator and student, as well as to the routine analyst; to the development engineer, and to the factory compounder. It is both a practical manual and an authoritative reference work. It belongs in all technical libraries, in plant laboratories, and in factory offices.

TABLE OF CONTENTS

Chap.

I. Composition of Crude Rubber—*A. Van Rossem*

II. Physical Properties of Raw Rubber—*G. Stafford Whitby*

III. Chemistry and Structure of Rubber Hydrocarbon—*Harry L. Fisher and Roscoe H. Gerke*

IV. Mastication and Plasticity—*Wilfred Gallay*

V. Structure and Behavior of Rubber in Liquids—*Warren F. Busse*

VI. Theories and Phenomena of Vulcanization—*Ira Williams*

VII. Vulcanization without Sulfur—*Iwan I. Ostromislensky*

VIII. Accelerators. Their History and Use—*Sidney M. Cadwell and J. W. Temple*

IX. Theories of Acceleration—*Winfred Scott and L. B. Sebrell*

X. The Physics of Vulcanized Rubber—*W. W. Vogt*

XI. Fillers and Reinforcing Agents—*Norman A. Shepard, John N. Street and Charles R. Park*

XII. History and Use of Substances which Improve Aging—*Waldo L. Semon*

XIII. Autooxidation and Deterioration by Oxygen. Prooxygens and Antioxygens—*Charles Dufraisse*

XIV. Deterioration of Rubber by Heat, Light and Ozone—*F. Harris Cotton*

XV. The Electrical Behavior of Rubber—*Archibald T. McPherson*

XVI. Properties of Latex—*W. A. Gibbons and P. D. Brass*

XVII. Industrial Uses of Latex—*D. F. Twiss, E. W. Madge and G. W. Trobridge*

XVIII. Hard Rubber (Ebonite)—*A. R. Kemp and F. S. Malm*

XIX. Rubber Derivatives of Commercial Utility—*T. R. Dawson and P. Schidrowitz*

XX. Synthetic and Substitute Rubbers—*Thomas Midgley, Jr.*

XXI. Gutta Percha and Balata—*J. N. Dean*

XXII. Reclaimed Rubber—*George W. Miller*

XXIII. Practical Compounding—*W. F. Russell*

XXIV. Physical Testing and Specifications—*Arthur W. Carpenter*

XXV. Chemical Analysis of Rubber and Rubber Products—*R. P. Dinsmore, R. H. Seeds and H. E. Rutledge*

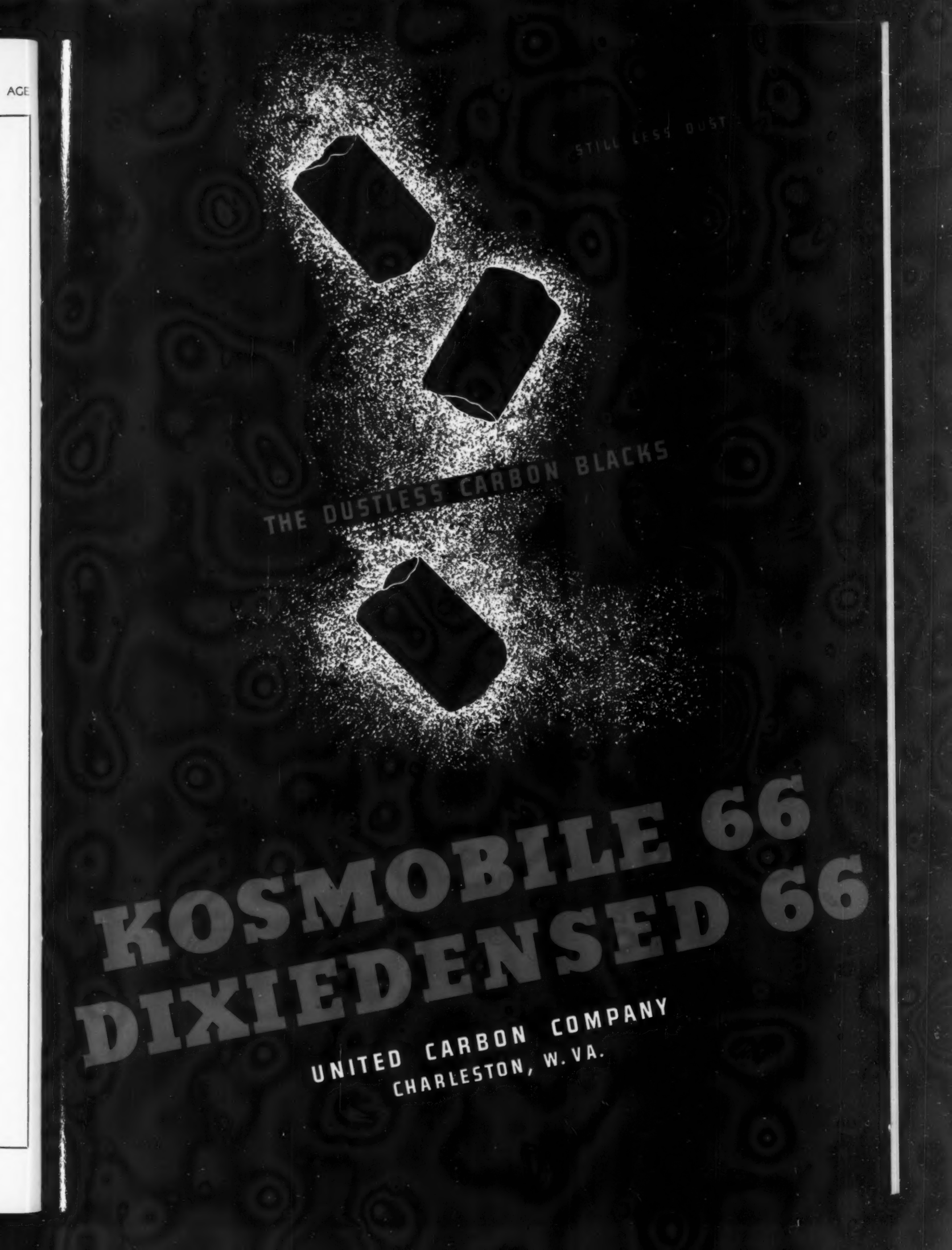
XXVI. Literature on the Chemistry of Rubber—*C. C. Davis*

896 pages—Illustrated—PRICE: $15.00

BOOK DEPARTMENT

THE RUBBER AGE

250 West 57th St., N. Y. City


STILL LESS DUST
THE DUSTLESS CARBON BLACKS
KOSMOBILE 66
DIXIEDENSED 66
UNITED CARBON COMPANY
CHARLESTON, W. VA.

DIXIEDENSED 66
KOSMOBILE 66

UNITED CARBON COMPANY
CHARLESTON, W. VA.